MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA

November 1944

The minutes and other publications of the Conchological Club of Southern California are not open to subscription. However, any of our friends interested in receiving them, may send us donations or stamps to help defray the cost of material and postage.

Any institution or library interested in filing these minutes is welcome to all available back issues and a place on our mailing list without charge. Students of particular problems are always welcome to ask us for specimens for study as wellas all information we may have.

The next meeting will be held December 3, at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. at 2:30 P.M.
We are now meeting the first sunday of each month.

Please mail all news about shells, shell publications, shell collectors, shell trips, localities etc. to your editor,

John Q. Burch,
4206 Halldale Ave.,
Los Angeles 37, Calif.

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We are in receipt of a number of very interesting and clear photographs showing the Japanese drill, Tritonalia japonica, in the act of drilling an oyster and others showing the destruction caused by this imported pest. Along with these came a photostatic copy of an article that appeared in the Southbend Journal. This interesting material was sent by Professor Trevor Kincaid, University of Washington, Department of Animal Biology, Seattle 5, Washington. Extracts from his personal letter follow:

" I have been following your discussion of the various groups with much interest. Up to date there does not seem much that I can add to your very thorough elaboration of the taxonomic intricacies. .. When you are all through we will have something to tie to.

A number of years ago I read a paper before the Western Society of Naturalists dealing with the species of mollusks I had found in the living state that had arrived with oyster seed from Japan. If you can find this there might be some items of interest to you. Some of these have assumed economic importance as you of course are aware. Tapes philippinarum has developed on a great scale in the lower section of the Puget Sound district and is coming into the market along with P. staminea. Tritonalia japonica has become a very serious menace to the oyster industry. Through inexcusable carelessness it has been transferred from its original site of importation at Samish Bay to other oyster growing districts. The only important area not yet invaded is Willapa Harbor., and that is threatened through the possible movement of seed oysters from Hood Canal, which is heavily infested, to Willapa. It seemed necessary to sound a warning note on this and this impelled me to send a letter to the local newspaper at South Bend in the hope of heading off this possible disaster. I have only one copy of the article sp I am sending you a photostat reproduction.

I am not yet entirely clear in regard to the Japanese Mytilus, and have not seen Eyerdam's specimens on which this record is based. Our common Mytilus edulis is subject to such enormous variations in size and appearance under different ecological conditions I probably overlooked the imigrant form.

Like yourself I may well be classified as a " professional conchologist" rather than an amateur, since I own and operate an oyster farm of 53 acres from which I derive considerable financial benefit. ....

Are you familiar with the extensive work on fossil mollusca published by Dr. C.E. Weaver of our Department of Geology in the University of Washington publications in Geology. It deals with the Tertiary formations of Oregon and Washington. It is in three volumes, two of text and one of plates. 627 pages and 103 plates, Costs $11.00.

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Lt. Jack W. Brookshire, 9th Troop Carr. Sqdn. A.P.O. 244, c/o P.M. San Francisco, Calif. We were delighted to receive the following interesting letter from our much missed member Jack. " Saipan, Marianas Is.,Oct.5,1944, 2030 O'clock. Dear John- I guess the last time I wrote I was back in Mississippi - and asking for addresses all over the Pacific- So far I've just used the Honolulu address. I visited Thaanum one evening on my rest leave last month Very interesting person and enthusiastic. He helped me on identifying some of my shells and I helped him with some Gilbert Islands data and a specimen or two. I do most of my Hawaiian collecting with a folla named Tuttle. He dives for shells too so we get along fine. I've become well acquainted with Wray Harris (mollusks); C.M. Cooke and Yoshio Kondo (both land shells), up at the Bishop Museum in Honolulu. The only land collecting I've done is a little on Oahu and some last week here in the Marianas. I'm delighted with the abundance of color and beauty of the shells in the Central Pacific. I never get near a complete collection from any one place but from all over I'm getting lots of shells. I spent February, March and June in Hawaii and from March the balance of the time was spent in the Gilberts and Marshalls. Now I'm just getting into Marianas shells- so far pretty good. Of course, being a navigator in the troop carriers I'm occasionally interrupted by flight duties. The mail must go through, among other things. Are there any central Pacific shells that I might run onto- and I might- that you want, let me know. As the Gilberts area has'nt been collected up till this time I may be of some help.

If you can lay hands on Hirasi's Japanese Shell Book let me know. Anything within reason is all right with me. I'm out here with no reference books whatsoever and its not easy keeping that catalogue with most of the names missing. Would you see if one of the club members has one that I can beg, borrow or steal.

Conrad Limbaugh is still up in Canada as a weather observer. He does'nt have much chance to collect up there, of course. He's inland. I got the club's minutes for March. I'd like to have the year's minutes en masse if I could- let me know the damages. Could you give me Fred Barnett's address ? Last I heard was 1942 when he joined the Coast Guard. I'd better git. Got some early flying manana. I get stacks of shells but I don't know what is good enough to talk about and what is'nt. Hirasi should help me. Say Hello to the folks at the club for me. Good Hunting. Jack Brookshire."

Note from the Editor-If any of the members have a copy of Hirase or know where one can be purchased please let me know and I will get it and see that it is sent to Jack along with all of our minutes and anything else we think he might like to have.

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Dr. Horace Gunthorp, 3510 Adams Ave., San Diego 4, Calif. Has just published another very extensive list of booksand periodicals on natural science. The list of literature on conchology is so impressive that all members interested in building a library should by all means check Dr. Gunthorp's new list. We added at least 25 or 30 items to our own library.

Mrs. H.P. Walker, Route 2, Box 242, Healdsburg, Calif. We are happy to welcome Mrs. Walker to our circle of west coast shell ~~enthusiasts~~. Members are invited to write her.

We propose for a short time to carry on more or less of a round table discussion of the various methods and difficulties in mounting the radulae of mollusks. This should be accompanied by articles pertaining to the use and value of the radula in classification. The members are urged to send in their comments and criticism as we progress.

- Mounting Radulae-

by Anne Gray Hackney

Let me say at the start, that like most shell collectors, I am not a scientist but only an interested amateur. I had to start at the beginning, when I started mounting radulae, and work it out step by step, by the trial and error method. If I can help anyone else to pursue this interesting hobby, I am glad. If anyone can help me, I shall be delighted.

Either freshly collected or preserved snails may be used. It is even possible to procure the radula from dried-up specimens. In this case, soak the entire shell in warm water overnight and then remove the animal with a hook before proceeding. Be sure not to work with more than one species at a time, as it is easy to get them mixed up, but if enough specimens are available, it is well to have several to work with, both for comparison and for probable failures along the line.

The buccal mass, in which the radula is imbedded may be easily found and removed in the larger marine snails by cutting from the mouth to behind the tentacles with a dissecting knife or razor blade and lifting it out carefully. In working with the smaller species, it is better to cut off the entire head.

A test tube and spirit lamp may be used for the next step, but for home use I have found it easier to fill a pyrex dish about half full of water and add a tablespoonful of potassium hydroxide. Add the snails and place over a low flame on the stove and let them simmer for fifteen or twenty minutes. The alkali will eat away all of the flesh but will leave the radula unharmed. Keep your face away while it is boiling, for the KOH will do the same thing to you that it does to the snail.

After the flesh has been eaten away, remove from the fire and allow it to cool for awhile. Unless the radula is microscopic, it may then be found by searching with a dissecting needle or tweezers. The radula should be quite clean and may now be mounted in a drop of water and examined under the microscope, after washing, if desired.

To mount them permanently, it is necessary to wash them very thoroughly for several hours, changing the water frequently. This is important, as it removes all traces of the alkali.

Staining is the next step, and the going begins to get hard at this stage. An aqueous solution of potassium bichromate for marine snails and chromic acid for the land are the time honored stains to use, but you can have a little extra fun experimenting with different dyes if you like. Staining is difficult for me and I am still trying for what I would call a perfect job. I leave them in the stain for about thirty minutes, then remove and wash thoroughly. This is one place where I always hit a snag. If I wash them ' thoroughly' , most of the stain washed out, and if I don't , the stain runs into the mounting medium later. Probably a much longer time in the dye than I have allowed would help matters.

Now I take a clean microscope slide and place the radula on it, being sure that the 'top' side is facing up. There should be just enough water to keep it moist, but not enough to allow it to float around. Place a tripod magnifier astride the slide and over the radula. For marine species, take a fine dissecting needle in each hand and carefully raise the marginal teeth and straighten them out on each side. If there is too much water and the specimen floats, draw off some with a small piece of filter paper, but be careful not to let it get too dry, or it will curl. It takes practice , but the idea is to have the radula ' hug' the slide. Usually, they are too long to fit cross-wise on the slide, and they may be mounted entire, lengthwise, or cut into shorter sections with fine sharp scissors and mounted crosswise, which is the method I prefer. The teeth sometimes stand out beautifully where the cut has been made and an individual row is easier to study this way. The land shells have a rather spoon-shaped radula and are much harder to handle. I straighten them out as much as possible, to begin with, using the dissecting needles to straighten out the front part where it is folded under. This is tedious. Hold the radula lightly with one dissecting needle, and slipping the other one underneath, work it out flat. This is important, for the teeth will not stand out under the microscope if it is double. You will find that it is still humped up in the middle. If you prefer a whole mount, carefully pull apart in several places along each sidewith the needles until it lies flat, otr it may be cut across entirely in several places. If you decide on this method, keep the pieces in order so that the different stages of tooth wear may be observed.

Now cut two strips of filter paper about ¼" wide and place them along-side the radula. Almost any paper will do, but filter paper is rather thick and so more satisfactory. Mark one of the papers " top" to insure against mounting it upside down later. Place another slide on top of this and tie them together with thread. This is important, for the teeth will curl up is they are not held flat.

Alcohol is a big problem these days,and it is sometimes impossible to buy it. I have used ordinary isopropyl rubbing alcohol with good results, but as this is only 70%, it is better to dehydrate further with an immersion in Xylene and carbolic acid before the radula is cleared. Place the slides in 35,50,70, and 95 per cent alochol for about fifteen minutes each, If rubbing alcohol is used, immerse in Xylene with a little carbolic acid added, after the 70% alcohol has been used. This will remove all traces of water, which is very necessary, or your mount will be ruined.

Place in Xylene for fifteen minutes to clear. This process makes the teeth stand out beautifully. Remove from the Xylene and cut the threads that held the slides together. Take off the top slide carefully. If you are lucky, your specimen will stick to the bottom slide, but too often it is the top one it sticks to. In this event, it may be possible to work them onto the bottom slide with a needle, but they are easily ruined at this stage, and it may be necessary to try again, which is why it is a good idea to have several to work with from the start. At any rate, they should lie flat and straight in the center of the slide. Any excess Xylene may be drawn off carefully with filter paper, but it is better to have too much than too little, for the Xylene dries quickly and makes them brittle and they may curl up again. If this happens, add a drop of Xylene and straighten them out.

If you have gotten this far successfully, the radula is now ready to mourtnt It makes things easier if you will prepare a card for use under your slides. Take an ordinary index card and draw around a glass slide which has been placed in the center of it. Now draw diagonal lines from corner to corner. Where they cross is the center of your slide. Take a cover glass, center it, and draw around this. Now, when you are mounting a specimen, you don't have to guess but can simply lay your slide on this guide. Cover glass props are not always necessary except with large specimens, but they are probably better at all times. Use tiny pieces of broken cover glass, as they will not show in the finished mount. Place three or four pieces of glass near the place where the edges of the cover glass will be,

You will have to learn how much balsam to use, but two good drops are usually about right. Here is another snag. As the balsam spreads , it may move your specimens with it. I drop the balsam on top of the radula carefully and have found this is usually more successful than dropping it to the side.

Take up your clean cover glass with forceps or cover glass holders and using your card as a guide, drop it carefully on the balsam. Here, again you may have trouble with drifting, but sometimes you can run a fine needle underneath the cover glass and put it back in place. It's disheartening to get this far and then ruin your mount, but you can always start all over again. The balsam should flowand fill the glass entirely. Too little of it will leave air spaces, which can be remedied by adding a drop at the edge of the cover glass; and too much will run out the sides and make an apalling mess. A toothpick wrapped in cotton can be used to remove most of this, but it is better to clean it up with Xylene after the slide has dried. This, too, must be done carefully, or the Xylene will dissolve the balsam again.

The slides are marked temporarily, while they are drying. A small piece of gummed paper, with a number is stuck on the end of the slide. Keep a note book and beside the number write the name, the stain used, the date and any other information that you want to put on your permanent label later.

The slides must be dried for several days in a warm, dry place. I made an ideal slide dryer from a child's toy refrigerator with a ten watt bulb run in from underneath. Prop up the bulb so that it does not touch anything, or lay it on a piece of asbestos which can be bought anywhere. Better be safe than sorry, and I would say that the asbestos matt is a ' must' , to prevent any danger from fire. Turn on the light and let the slides dry for several days, or until the mount is quite dry. After this, clean up any balsam that is outside the cover glass with a toothpick wrapped in cotton and moistened with Xylene. Print a 1" x 1" gummed label with the name of the species, the word 'radula', the stain used and any other information that you wish to include. On the bottom of the label print your initials and date. The label is stuck on the left side of the slide, but be sure to remember that a microscope reverses the image, and it will appear upside down to you, now.

None of this is easy; it is tedious and exacting work, and you will have many failures along the line, but like everything else that is hard to do, you will have the satisfactory feeling, when you do succeed, of really having accomplished something.

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Some informal comments on the above paper and the radula problem by T.A. Burch follow.

While the preliminary proceedures are handled in practically the same manner by almost everyone, probably no two persons stain the radulas the same way. This is especially true if one uses stain other than the time honored chromic stains (which, incidentally, I have never used). Since Mrs. Hackney has explained her method, I will describe only the various staining proceedures that I have used and a few things that I do differently.

First of all, while it undoubtedly is better tecnique, I have never washed a radula over a few minutes in water before proceeding with the dehydration. For dehydration and also for mixing stains I use commercial 99% Isopropyl alcohol which can be purchased reasonably at several chemical supply companies in this area and I suppose elsewhere. I use only 70%, 90% and 99% and leave them in only about two minutes, or rather until the next convenient time to move them since whenever I do get around to stain, I usually have a whole series going through with one radula or species in each different kind of reagent (never a dull moment this way).

The greatest difference between my tecnique and that employed by Mrs. Hackney is that I do not put the radula on the slide until the very end of the proceedure. I clear the radulas with either oil of wintergreen or cedar wood oil as they do not extract analine dyes and they clear readily from 95% or 99% alcohol without shrinkage. The radulas can be left for any length of time in these oils without becoming brittle and radulas can be mounted into balsam directly without first putting them into Xylene (which makes them stiff and brittle). Beachwood creasote can also be used.

Nothing is more aggravating than to lose or even have to search for a very small radula in order to transfer it to the next reagent. In order to avoid this I have made a number of what I call " staining tubes" which are merely short pieces of shell vial or test tubes which has one end closed with paper from tea bags. Thus after the radula is one put in the staining tube, the whole tube is transferred each time instead of just the radula.

Th reagents are placed in shallow containers (glass caster holders work nicely) so that the top of the tube is higher than the fluid. They should be drained each time before transfering by holding it against the side of the reagent container. These tubes are not necessary with larger radulas.

Following are directions for two simple methods of staining radulas which usually give good results. The basic fuchsin method is best but more difficult. Stains can be purchased from Brauns or other supply houses.

Basic Fuchsin Method

1. Boil radula or animal in NAOH or KOH 10% until connective tissue is all dissolved.
2. Dehydration- 70%-90%-99% alcohol (2-10 min. ea.)
3. Clear in wintergreen oil - one day (or cedarwood oil).
4. Wash in 95% alcohol
5. Basic fuchsin - (Sat. Soln. in 95% alcohol) 1-2 minutes
6. Rinse in 70% alcohol and destain in 95% until stain no longer comes out readily (as with Mrs. Hackney's tecnique, this is where you experiment).
7. Place in wintergreen oil or cedarwood oil until convenient to mount.
8. Mount in either balsam or euperol.

Eosin Method

1-2 Same as above.

3. Sat. soln. Eocin Y in 95% alc.- 20 min.
4. Wash in 95% alcohol
5. Clear in cedarwood oil- 1 hr. to 1 day or whenever convenient to proceed.
6. Mount in balsam or euperol.

With both of these proceedures the radula is not straightened out until the last thing at which time be sure to keep it in a drop of oil until just before the balsam is applied when this oil should be drained off with a piece of filter paper. I usually mount one radula complete and one torn up so that the individual teeth can be studied more easily.

I usually put only a very small drop of balsam on the radula and add the rest from the side of the cover slip. This way it is easier to keep the radula where you want it under the coverslip but makes a messy looking slide. While drying I place a small shell vial full of lead shot directly over the cover-slip which helps keep the teeth flat. After the balsam has hardened I clear off the excess from the outside with a razor blade before finishing with a Xylene soaked rag.

While the standard method is to put the label on the left side I have always used two labels- one with the genus, species, stain, clearing reagent, date, radula # and initials on the right side and put a label with the class, order, superfamily, and family on the left side. Incidentally it is a good idea to give grades to your work so you can tell without looking through a microscope which are your best slides.

I will be glad to answer any questions that I can and to receive suggestions from anyone. In the near future I will write an article on the use of radulae in classification.

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Notes on Mytilus

by Allyn G. Smith

Several days ago I promised to send you some notes on the discussions of *Mytilus* appearing in the Minutes of the Conchological Club of Southern California, particularly with respect to the possibility of the occurance of *M. dunkeri* Reeve on the California coast. The issues of the Minutes referred to are No.30, p. 9; No. 36, pp 6-9; No. 37, p.11.

Mytilus edulis Linnaeus

As everyone recognizes, we are dealing here with an exceedingly protean species, one that has been collected in all sorts of shapes and sizes, depending upon the location and circumstances of growth, both physical and ecological. It is also a species that is widespread over the north and south temperate regions of the world, and apparently from our experience here on the Pacific Coast, it is still spreading.

As the tendency these days is to pay more careful attention to species in the broad sense, rather than give so much weight to individual variation, I am inclined to think that for *M. edulis* we have an excellent example in considering the questions of taxonomy that have been bothering us. Thus, I would not try to separate *M. edulis* into a lot of subspecies and certainly not those that have been named from the Pacific Coast. This means placing names like *trossulus* Gould, *glomeratus* Gould, *galloprovincialis* Reeve, and others that are undoubted races of edulis into synonymy and forget them.

Through the kindness of Walter Eyerdam, who has loaned me a number of specimens from his collection, I am able to illustrate pretty well the extent to which *edulis* varied in shape. The attached outline drawings, Figs. 1-14, inc. show what I mean. The first four of these are tracings from original figures from Reeve and Gould.

Although one hesitates to make generalizations in a situation of this kind, I am inclined to think it might be possible to say that *M. edulis* generally has an outline consisting of straight lines or convex curves, and the umbones are therefore usually not hooked. Also, more often than not, the ventral margin is straight, or nearly so. In the form *galloprovincialis* (Fig.2) the dorsal and ventral margins are parallel, or nearly so, and this would seem to be the distinguishing feature of this French Mediterranean race, in addition to its greater length with respect to heighth In addition, another distinguishing general feature of *M. edulis* and its races is the relatively thin shell, alhhoughthere are exceptions to this. A third general feature (and what seems to me to be an important one) is the dull blue or purple and white interior, without much pearly nacre or prominent muscle scars. There seems to be another *M. edulis* generalization that one might make. This is the shape of the byssal gape, which is elongate and quite narrow, with a relatively small opening. This is about as far as you can go. Certainly the shape of the shell is so variable, both as to outline and to rotundity, that it does not admit of generalization.

There seems to be a minor difference between the two specimens of M. *thyrrenus* Montserrat. The one from Italy has a straight ventral margin, while the one from Malta has a slight ventral bulge near the umbones, a feature that has a bearing on identification of *M. crassatesta* Lischke, which I will discuss later.

Mytilus grayanus Dunker.

This was described later as *M. dunkeri* Reeve, as Miss Keen points out. Therefore *dunkeri* goes into synonymy. Hanna, Hertlein and I agree with Lamy and with Miss Keen on this. Also, Dunker himself later stated that Reeve's shell was the same as his *grayanus*.

Traced outlines of the figures for *dunkeri* in Reeve and Lischke are attached (Figs. 15 and 16). Outlines of other specimens are shown in Figs. 17-20, incl.

The best discussion of dunkeri appears in Lischke (Japanischke Meeres-Conchylien, Vol.I, 1869). He refers to the nacreous interior and the punctations in the nacre, both being features that I have suspected all along would serve to set grayanus apart from other species, and most certainly from edulis. Lischke compares his material with M. galloprovincialis (a fortunate circumstance from our point of view just now), on the principal basis that grayanus has an incurved posterior outline back of the dorsal angle, which, he says, is more pronounced in younger shells of grayanus, This is brought out well in the outline of Eyerdam's shell from Port Arthur (Fig.19) and of the CAS specimen from Japan (Fig.20). The only shell that does not check is Eyerdam's Vladivostock specimen, but this has the heavy pearly nacre and the punctations in the interior (and also other features that a re distinguishing). The shell is an old specimen that is like edulis only in shape.

Lischke's figures are colored and incluse one of the interior of the shell. This interior figure shows an extremely highly colored nacre shot with purple blueand green. Allowing for moderate exageration, the Academy's lot from the Akhashi coast of Japan (Fig. 17) and the two younger specimens illustrated by Figs. 19 and 20 are very much like it.

So, as I see it now, we have the following characters to look for in identifying M. grayanus:

a. Ventral margin usually concave near the umbones.
b. Umbones with a prominent hook.
c. A concave or incurved dorsal margin back of the dorsal angle.
d. Shell fairly heavy. (Generally heavier than edulis.)
e. Interior with a bright pearly nacre colored with green as well as purple and lighter colors. This sets this species off from edulis.
f. Interior punctate irregularly, the punctations more numerous near the umbonal section. Another feature entirely lacking in edulis.
g. Interior hinge line heavier and the groove generally cut deeper than in edulis
h. Byssal gape open and rounded. In edulis it is longer and quite narrow; it is hardly " open" as in grayanus.
i. Shell striate basally, near the umbones. This is a feature that may not be a constant one, and hence not too reliable.

Perhaps the above will help to support our contention that while the new mussel from Southern California may not be edulis, it certainly is not grayanus . Of course, everything I have said is based on shell characters of material at hand and on old accounts. The statement in the Minutes (No.30, p.9) to the effect that Dr. Coe found the animals of your Southern California shells different from edulis is a bit disturbing. It would be interesting to determine from him just how different he found the local material and on what basis the comparison was made. Until this is cleared up there will be a doubt that they are properly identified as M. edulis.

Another point that I should clear up is our comparison of Academy shells from the Mediterranean with the Southern California high-winged shells, with the conclusion drawn that they were M. e. galloprovincialis. When I made that statement I had not been able to consult Reeve's figure.Now that I have seen it, we shall have to re-label the Academy lot called galloprovincialis as the shellsare high-winged, like those from Anaheim. (See Minutes No.37, p.11).

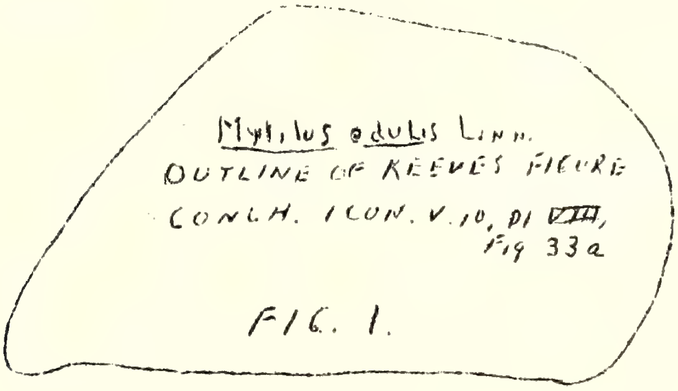
Mytilus crassatesta Lischke.

I mention this species beaause evidently confusion exists between it and grayanus (dunkeri). Eyerdam had labelled his specimen of grayanus from Vladivostock as crassatesta. Also in the Academy collection, the lot of grayanus from the Akhashi Coast of Japan (Frederick Stearns Collection) had this name .

Lischke's original figure of crassatesta is attached, in outline only, as Fig. 21. If this figure is a good one for the species, then there should be no difficulty distinguishing it from grayanus. In addition to general shape, Lischke calls particular attention to the bulge in the ventral margin adjacent to the umbones at the position shown in my figure. This, and the absence of anything like a high wing, as in grayanus , would seem offhand to make identification not too difficult. However, undoubted shells of the species are needed to settle the point. I haven't looked into the situation too thoroughly except to satisfy my own mind that while the two species may be related, they appear to be different enough to separate.

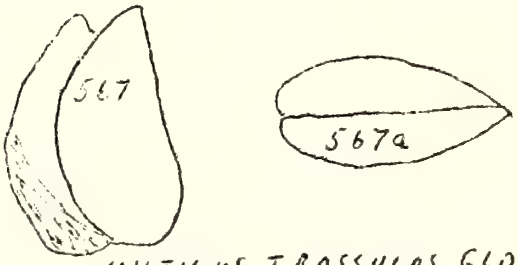
South American Species

D'Orbigny's figure of platensis is shown by the outline in my Fig.22. The straight basal margin is typical of edulis and it may well be a race of this species, as Eyerdam labels it in his shell from Patagonia. However, the outline of his Patagonia shell (Fig.23) shows a slight basal bulge, a character of crassatesta. The shell from Chile (Fig.24), looks like a globose race of edulis, both outside and inside. The Patagonia shell has a yellowish coloration on the base and may not be a race of edulis.



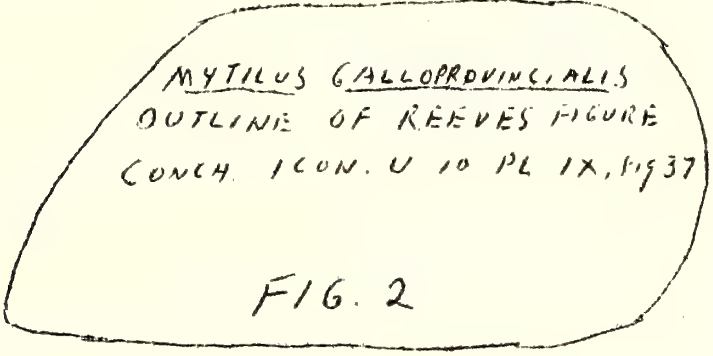
Mytilus edulis Linn.
OUTLINE OF REEVES FIGURE
CONCH. ICON. V. 10, Pl VIII,
Fig 33a

FIG. 1.



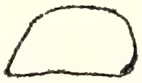
MYTILUS TROSSULUS GLD.
OUTLINE OF GOULDS ORIGINAL FIGURES
ATLAS, MOLL., U.S. EXPL. EXPED.
PL. 41, FIGS. 567, 567a.

FIG. 3.



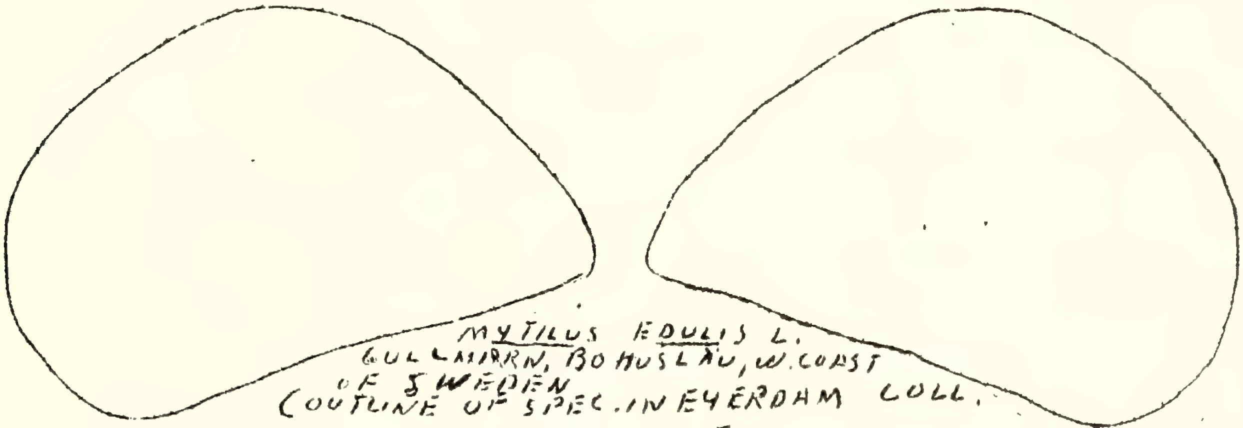
MYTILUS GALLOPROVINCIALIS
OUTLINE OF REEVES FIGURE
CONCH. ICON. V 10 PL IX, Fig 37

FIG. 2



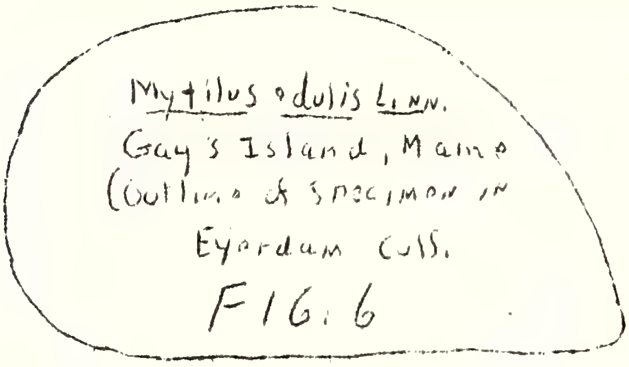
MYTILUS GLOMERATUS
OUTLINE OF REEVES FIG.
CONCH. ICON. V. 10, PL XI
FIG. 60

FIG. 4



MYTILUS EDULIS L.
GULLMARN, BOHUSLAU, W. COAST OF SWEDEN
(OUTLINE OF SPEC. IN EYERDAM COLL.

FIG. 5



Mytilus edulis Linn.
Gay's Island, Maine
(Outline of specimen in
Eyerdam Coll.

FIG. 6

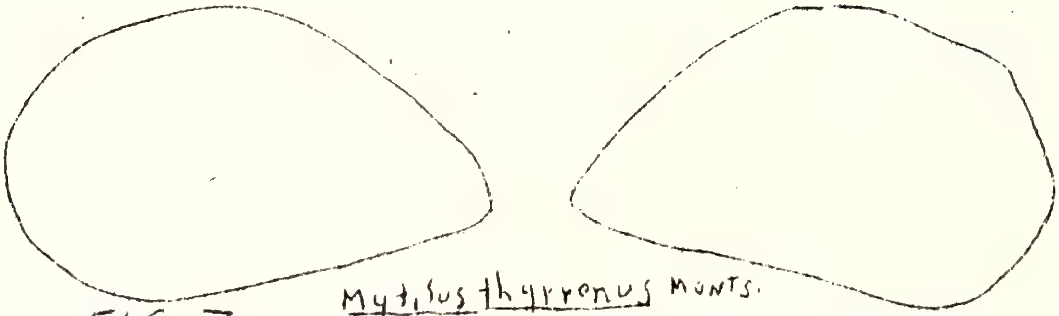


FIG. 7

Mytilus thyrrenus Monts.
Spezia, Italy - SPEC. IN EYERDAM COLL.

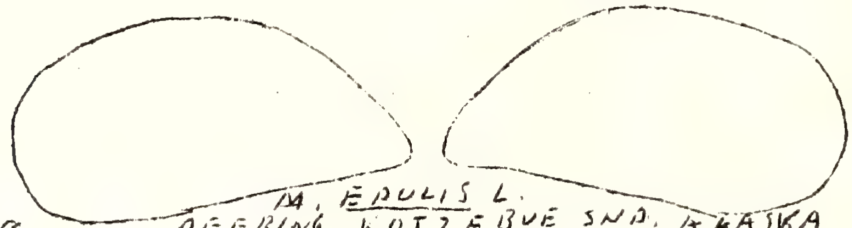


FIG. 8

M. EDULIS L.
DEERING, KOTZEBUE SND. ALASKA
(OUTLINE OF SHELL IN AGS COLL)

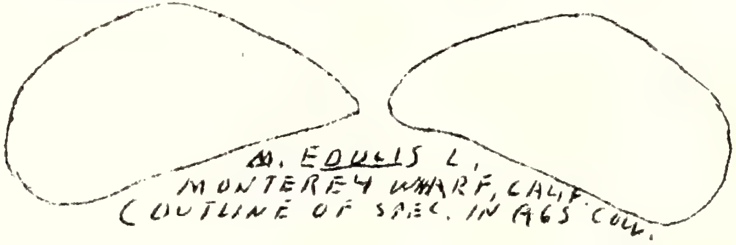


FIG. 9

M. EDULIS L.
MONTEREY WHARF, CALIF.
(OUTLINE OF SPEC. IN AGS COLL.

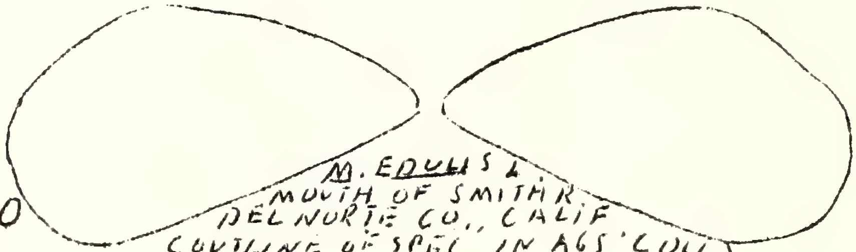


FIG 10

M. EDULIS L.
MOUTH OF SMITH R.
DEL NORTE CO., CALIF
(OUTLINE OF SPEC. IN AGS' COLL.)

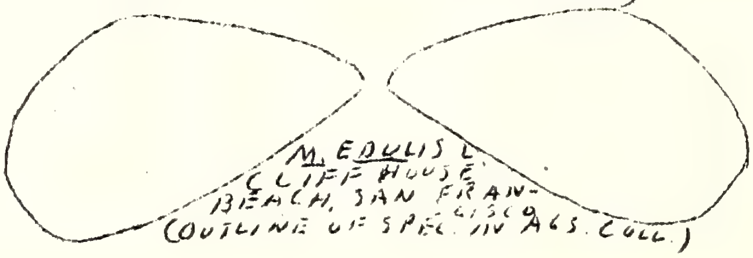
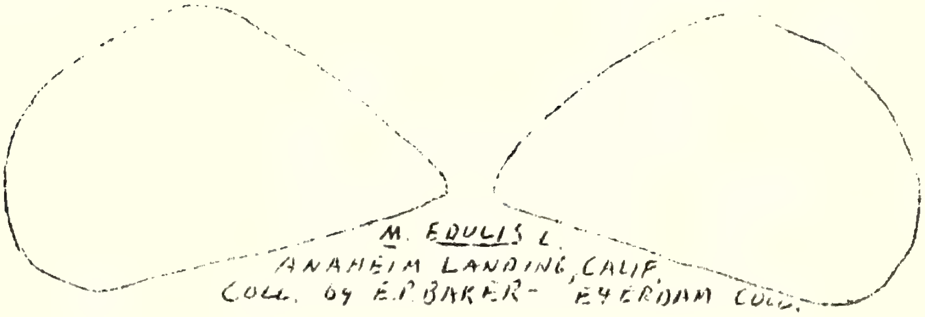


FIG 11

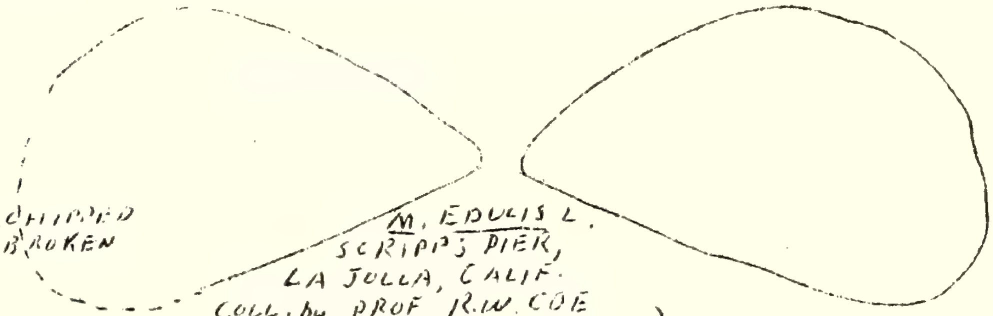
M. EDULIS L.
CLIFF HOUSE
BEACH, SAN FRAN-
CISCO
(OUTLINE OF SPEC. IN AGS. COLL.)

FIG. 12



M. EDULIS L.
ANAHEIM LANDING, CALIF.
COLL. by E.P. BAKER - EYERDAM COLL.

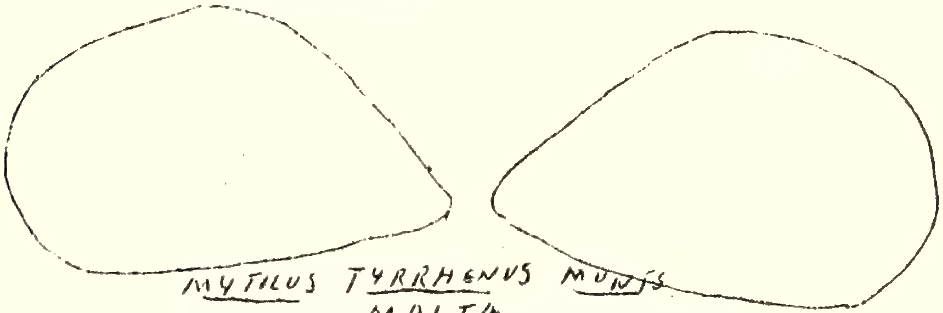
FIG. 13



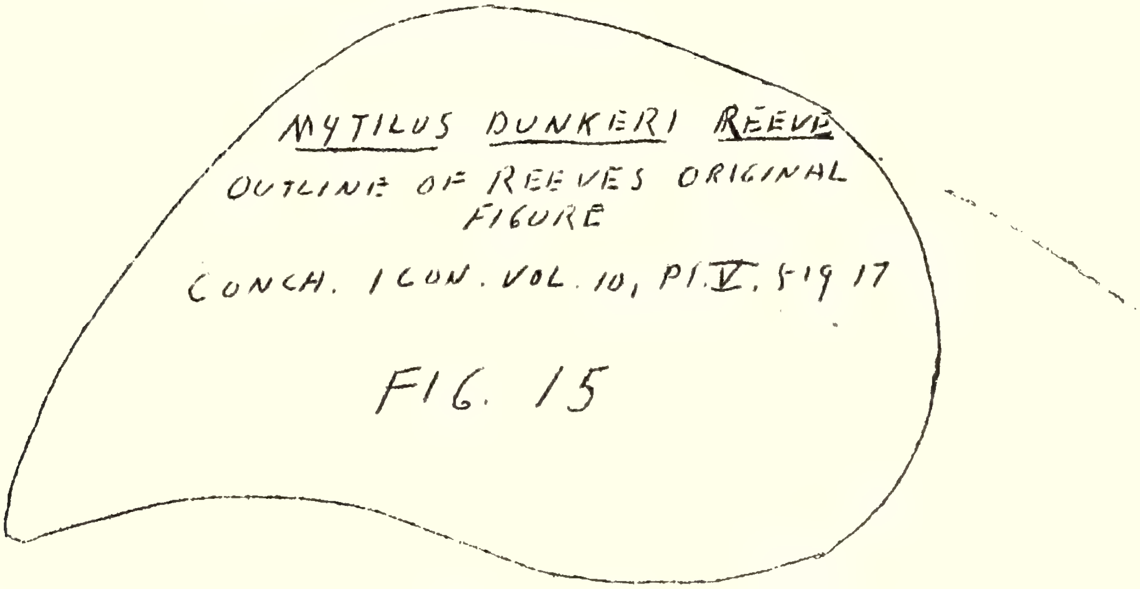
EDGE CHIPPED
AND BROKEN

M. EDULIS L.
SCRIPPS PIER,
LA JOLLA, CALIF.
COLL. by PROF. R.W. COE
(SPECIMEN IN AGS COLL.)

FIG. 14

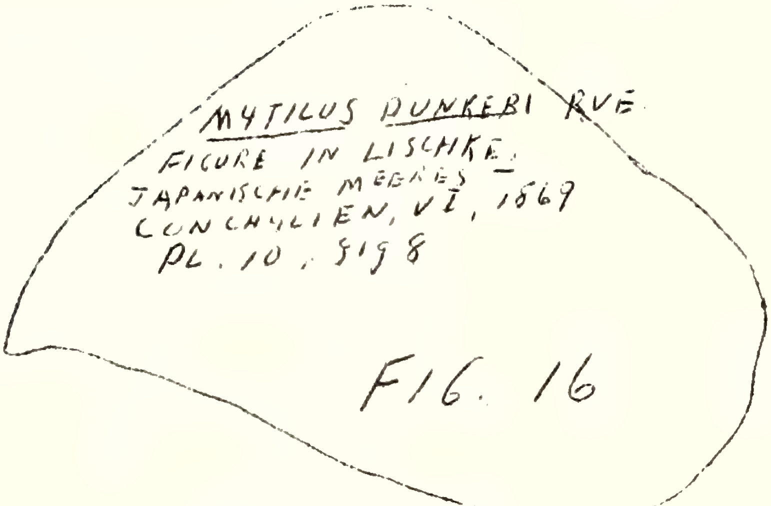


MYTILUS TYRRHENUS MONTS.
MALTA
SPECIMEN IN EYERDAM COLL.



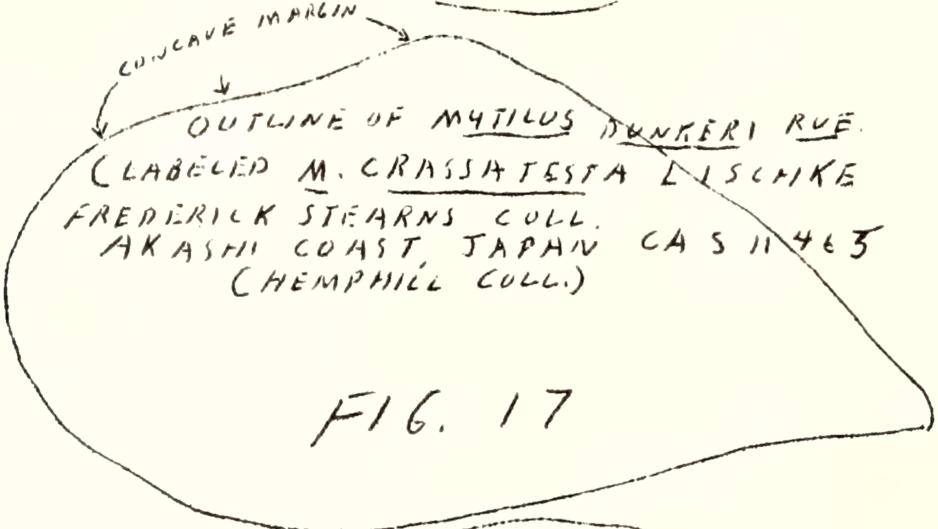
MYTILUS DUNKERI REEVE
OUTLINE OF REEVES ORIGINAL
FIGURE
CONCH. ICON. VOL. 10, Pl. V, fig 17

FIG. 15



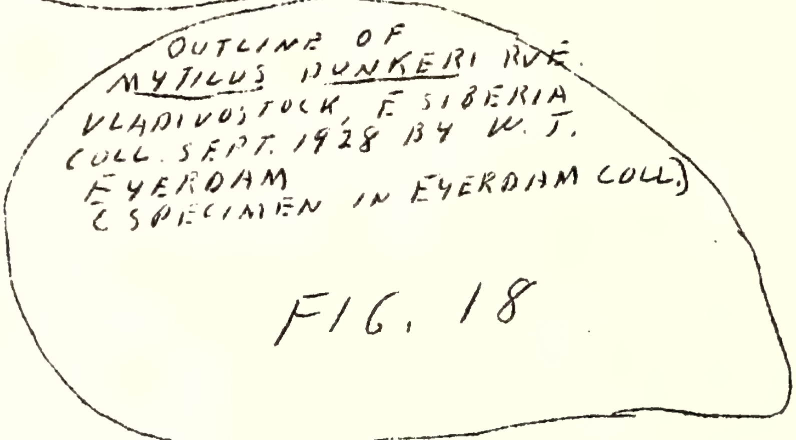
MYTILUS DUNKERI RVE.
FIGURE IN LISCHKE,
JAPANISCHE MEERES
CONCHYLIEN, VI, 1869
PL. 10, fig 8

FIG. 16



OUTLINE OF MYTILUS DUNKERI RVE.
(LABELED M. CRASSATESTA LISCHKE
FREDERICK STEARNS COLL.
AKASHI COAST, JAPAN CAS 11463
(CHEMPHILL COLL.)

FIG. 17



OUTLINE OF
MYTILUS DUNKERI RVE.
VLADIVOSTOCK, E. SIBERIA
COLL. SEPT. 1928 BY W. T.
EYERDAM
(SPECIMEN IN EYERDAM COLL.)

FIG. 18

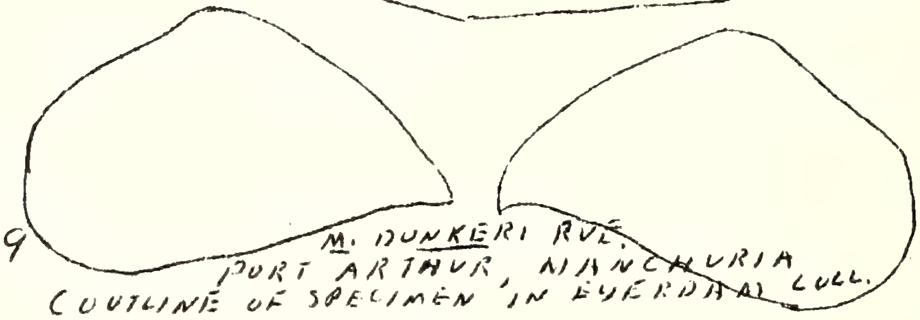


FIG. 19

M. DUNKERI RVE.
PORT ARTHUR, MANCHURIA
(OUTLINE OF SPECIMEN IN EYERDAM COLL.

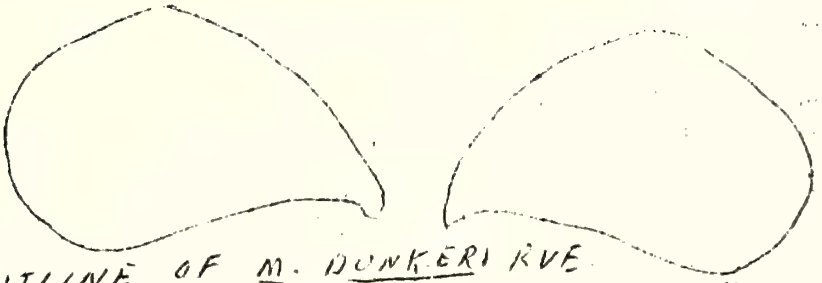
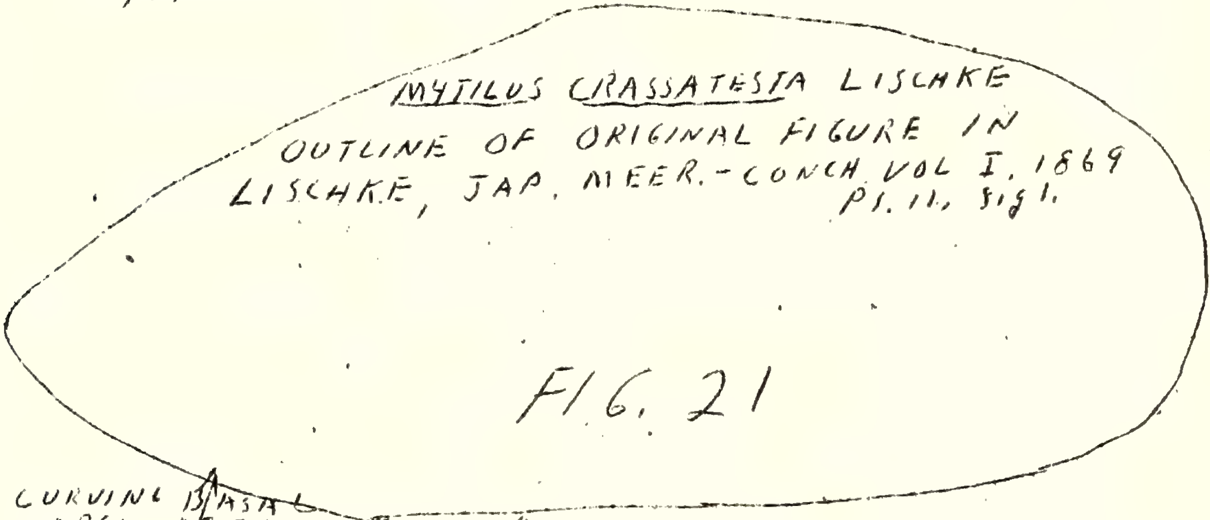


FIG. 20

OUTLINE OF M. DUNKERI RVE.
FREDERICK STEARNS COLL. CAS 11464

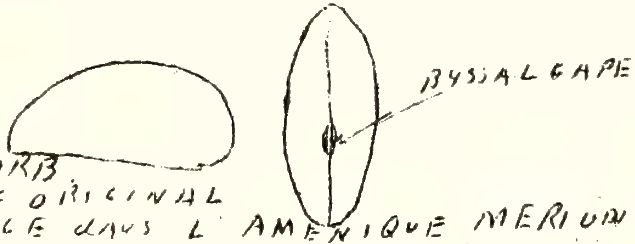


MYTILUS CRASSATESTA LISCHKE
OUTLINE OF ORIGINAL FIGURE IN
LISCHKE, JAP. MEER.-CONCH. VOL I, 1869
Pl. 11, fig 1.

FIG. 21

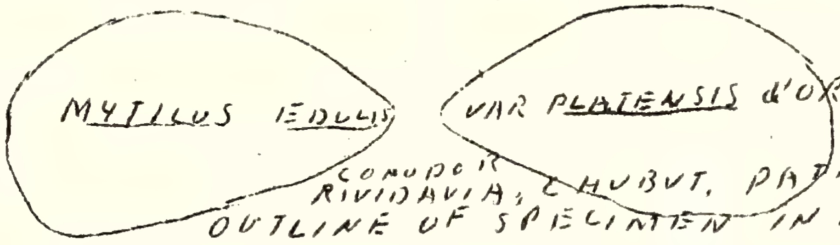
CURVING BASAL
MARGIN AT THIS POINT IS A
MAIN FEATURE OF THE SPECIES

FIG. 22



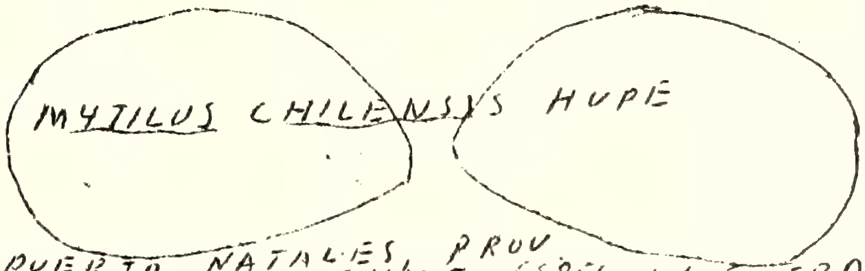
M. PLATENSIS d'ORB.
OUTLINE DRAWINGS OF ORIGINAL
FIGURES. D'ORB. VOYAGE dans L'AMERIQUE MERIDIONALE
ATLAS, VOL. 5, 1846, PLATE 85, FIGS. 3,4.

FIG.
23



MYTILUS EDULIS VAR PLATENSIS d'ORB.
COMODOR RIVIDAVIA, CHUBUT, PATAGONIA
OUTLINE OF SPECIMEN IN EYERDAM
COLL.

FIG.
24



MYTILUS CHILENSIS HUPE

PUERTO NATALES, PROV.
MAGELLANES, CHILE. (SPEC IN EYERDAM
COLL.

Some Notes on Terebridae

by J.R. le B. Tomlin

These notes were made during a complete overhaul of the series in the British Museum a short time before the war.

Deshayes published two important papers on Terebra, one in the Journal de Conchyliologie vol. vl, pp 65-102, 1857, with figures; the other in the Proc. Zool. Soc. London, 1859, pp. 270-321 without figures. The latter paper, called " A General Review of the Genus Terebra", is a complete catalogue to date. Both papers describe many new species, mainly from the Cuming collection; when the novelty is recorded from some other source as well I designate the Cuming example or examples as type, as these are always mentioned first. B.M. -- British Museum.

Deshayes numbers his catalogue in the P.Z.S. 1-221 and there is also an unnumbered list of 63 doubtful species. Below I give his number with each species.

75. Terebra luctuosa Hinds. Gulf of Nicoya: Puerto Portrero. Types (3) in B.M.
89. Terebra armillata Hinds. Abundant in various places on West Coast of America between Panama and Bay of Magdalena: also Galapagos.
102. Terebra rufocinerea Carpenter. Mazatlan. Type, Mazatlan Coll. (one)
103. Terebra albocincta Carpenter. Mazatlan. Types, Mazatlan Coll. (five)
104. Terebra chilensis Deshayes. Chili. Type in Deshayes Coll., Ecole des Mines, Paris.
107. Terebra variegata Gray. No Loc. given. Type in B.M. (one). The types of Terebra africana Gray (two), which is identical with variegata, are also in B.M. Deshayes says this comes from the Gulf of California.
139. Terebra radula Hinds. Puerto Portrero. Type in B.M. (one).
140. Terebra aspera Hinds. Panama,Monte Christi, S. Elena. Type in B.M. (One) This and radula Hinds are identical.
141. Terebra petiveriana Deshayes. Panama. Types in B.M. (two). Very close to aspera.
142. Terebra glauca Hinds. Hab. unknown. Type in B.M. (one): identical with aspera as its author suspected.
146. Terebra varicosa Hinds. Gulf of Papagayo. Two in the B.M. are probably types. It is identical with larvaeformis Hinds.
147. Terebra tuberculosa Hinds. Panama, San Blas, Gulf of Papagayo. Type in B.M.(one) presented by Belcher, from whose collection Hinds says that he described it.
148. Terebra intertincta Hinds. Said to be from Gambia but this is certainly an error: the single type in the B.M. is evidently a Panamic form.
149. Terebra plicata Gray. No. Loc. given. Type in B.M. (one). Hinds says that Cuming dredged the species at Guayaquil.
150. Terebra specillata Hinds. San Blas, Mexico. The B.M. has one example presented by Belcher and bearing a label in Hinds writing. It is probably type though it is somewhat shorter than Hinds measurement.
151. Terebra larvaeformis Hinds. S. Elena and Monte Christi. Types in B.M. (three)- so marked by Smith. There is also an example from Guayaquil presented by Belcher, with label in Hinds writing.
156. Terebra elata Hinds. Bay of Montijo. Types in B.M. (three).
175. Terebra formosa Deshayes. Panama. Type in B.M. (one).
177. Terebra incomparabilis Deshayes. Panama. Type in B.M. (one). Identical with formosa.
180. Terebra insignis Deshayes. Panama. Type in B.M. (one). Identical with lingualis Hinds.
181. Terebra lingualis Hinds. Gulf of Papaguayo & Bay of Montejo. Types B.M. (3)

Editor's Note- The personal letter from Mr. Tomlin that accompanied the above paper is of such interest that the liberty is taken of running a few excerpts from it.

" I have not given the original refs. for descriptions and figures for fear of making it too long, but could, of course, do so, if desired.

The localities are exactly as given in the original descriptions.

Deshayes was one of Cuming's ' toadies' ready to describe as new anything he was told to, for the sake of getting specimens. His collection went to the Ecole des Mines in Paris.

Cuming had a regular coterie of these men who published his novelties. I have heard from collectors of his (i.e. Cuming's) generation how he would lay out on a long table all the material of a genus or family which he considered to be new. If the man who was invited to describe it all objected, he got the ' sack' without more ado. He was allowed no choice in the matter. "

****

Dr. T. Van Hyning, The Florida State Museum, Gainesville, Florida. We were pleased to receive an interesting letter from Dr. Van Hyning and inclosing information about his interesting institution. Dr. Van Hyning was the founder as well as the present director of the museum. An extract from his letter follows: " My work at present in Molluscan science is confined to Florida alone, but of course, we have to consider more or less the whole west Atlantic coast. I have now around 1300 species of Florida well proven up with good data. From this I have selected a single typical specimen each and have them arranged in classified order on a table nearly 100 feet long which I call the Florida section of comparative Mollusca and then the balance packed away from which I can select an exhibition series later on. ... while I have a collection of shells representative of the world, yet I have a very few species of the Pacific Coast."

Beal-Martbie Shell Museum, at Rollins College, Winter Park, Florida. We have a friendly letter from Mr. P.A. Vestal, Director. " ... May I state that we have a large file of the minutes of the Conchological Club of Southern California, which we find very interesting and useful.

We would appreciate being retained on your mailing list, and in the future if we have and publications they will be sent to your club. At the present time we are doing very little in the publications line.

As you probably know, Mr. Maxwell Smith is now in Winter Park and uses our collection quite frequently. He, of course, has a large collection of his own but usually his publications include the material present in the Beal-Maltbie Shell Museum."

Dr. B.R. Bales, Circleville, Ohio. We have another of Doc's newsy letters that always seem to bring good cheer. Doc is planning to move to some nice warm spot where shell collecting will be good this winter. We await his choice with interest. And his notes are always very flattering to these small sheets " Iam enclosing a little of what it takes to buy postage stamps and I imagine you have a bigger mailing list than any other shell publication." That last is at least encouraging. In the first place we are flattered to even be called a publication and as to the mailing list we have no idea. Our mailing list has never exceeded 700 and surely many of the old established printed periodicals go to many more than that.

****

In connection with our discussions of the new Mytilus grayanus or sp. it seems to have been the general opinion of Mr. Allyn Smith and others who are interested in this problem that there has been no introductions of the Japanese oysters in southern California. We have been of the opinion that they had been introduced and grown in Newport Bay and also by Sam's in Anaheim Bay . We have specimens labelled O. laperousii Schrenck from Newport Bay. ????????

Mr. and Mrs. George W. Austin, 6831$\frac{1}{2}$ St. Esteban St., Tujunga, Calif. This is the new address of the Austins.

Dr. John W. Nevius, 1930 Wilshire Blvd.,Los Angeles 5, Calif. " I enjoy your club minutes and regret not being able to come to the meetings. Enclose $1 toward mailing expense."

Cpl. F.M. Bayer, 36 Photo Reconnaissance Sqdn., Muskogee Army Air Field, Muskogee, Oklahoma. We are happy to have another letter from Ted calling attention to the fact that he has made still another move.

Bernice P. Bishop Museum, Honolulu, Hawaii- Librarian- " Minutes received and catalogued. As you know our interests are Pacific, first and foremost, but adjacent areas are of interest too, and I never know what will be called for. Thank you for your generosity."

Professor Charles E. Burt, Southwestern College, Winfield, Kansas. " This is to inform you that after December 15 my address will be P.O. Box 536, Topeka, Kansas. Recently I have resigned my position as Professor of Biology at South-western College effective at the close of the present semester. I have pur-chased a home and buildings that will serve as a laboratory for the conduct of a specimen and curio business under the name of Quivira Specialties Company, at 4010 West 21st Street in Topeka, Kansas. I plan to devote about four months of each year to travelling and to continue research. I enjoy reading the Min-utes of the Conchological Club of Southern California and will appreciate it if you will change the address on this mailing list."

Miss Verna Mann, 430 N. Parish Pl., Burbank, Calif. New address.

Mrs. E.W. Boerstler, P.O. Box 494, Corona del Mar, Calif. In the last Minutes we ran the wrong box number for the Boerstlers. It is 494.

Mr. R.E. Galbreath, R 1, Box 48, Newhall, Calif. We were delighted to have a visit from our friend and host on many occasions recently. Our only regret is that we got into the duplicates too late to really do them justice. So we sincerely hope that Galbreath will return to go through the rest of them.

Dr. Carl L. Hubbs, The Scripps Institution of Oceanography of the University of California, La Jolla, Calif. A short time ago we received an interesting new publication by Dr. Hubbs " Relationships of Alepidomus, A New Genus Of Atherinine Fishes From The Fresh Waters of Cuba, Occasional Papers of the Museum of Zoology, University of Michigan, Ann Arbor, Mich. Number 488, Sept. 2, 1944.

While we think of Dr. Hubbs as an ichthyologist the following excerpt from his personal letter of recent date gives us the right to claim him also. " It may be of passing interest to relate that my introduction to natural history came through the collecting and study of sea shells. When I was a queer little shaver in San Diego about 40 years ago my grandmother adopted me as a partner in her shell collection. I kept up the interest and in high school days spent many months in studying Tryon's Manual in the L.A. public library, draw-ing up a family tree of all the molluscs. The result of the adolescent res-earch has long since vanished, but the spirit of inquiry lives on."

Dr. Wesley R. Coe and Denis L. Fox of the Scripps Institution of Oceanography, were authors of a paper of particular interest to us in our recent interest in the california Mytilus. This paper is " Biology of the California Sea-Mussel (Mytilus Californianus), I. Influence of Temperature, Food Supply, Sex and Age on the Rate of Growth, J. Exp. Zool, v. 90, no.1, June 5,1942. The paper consists of 30 pages and numerous charts.

Lt. John E. Davis, SAAAB, Santa Ana, Calif. We regret hearing the news that Lieutenant Davis will not be able to remain with us, but hope that he will keep in touch with us and perhaps meet other members of our group some of whom seem to be serving at this time in just about every theatre of war on earth.

We are in receipt of a new publication by Dr. Paul Bartsch, " Some Turrid Mollusks of Monterey Bay and Vicinity", Proceedings of the Biological Society of Washington, vol.57, pp 57-68, Oct. 31,1944.

In this fine paper Dr. Bartsch has described several new species as well as the following new genera, Rectiplanes, Type: Rectiplanes santarosana (Dall) Several of the members have this species probably labelled Antiplanes. It is not rare in fairly deep water off southern California. Rhadopetoma , Type: R. rhadope Dall (-- Borsonella rhodope Dall). Carinoturris, Type: C. adrastia (Dall) (-- Cryptogemma adrastia Dall). And a new species C. fortis is described Megasurcula granti is a new species described, and it is quite possible that many of us have it when we can definitely identify our shells. It belongs to the nodulose group according to Dr. Bartsch and the difficulties in this group increase with the number of specimens you happen to have. Ophiodermella, Type, O. ophiodorma (Dall). This genus will include, of course, the common southern California species most of us have labelled Moniliopsis incisa ophioderma. Kurtzia, Type: K. arteaga (Dall and Bartsch) (-- Mangilia arteaga D. & B.). Again it is probable that all of us have arteaga, one of our most common species Dr. Bartsch describes a new species Kurtzia gordoni from off Santa Cruz. Kurtzina, Type: K. beata (Dall) (-- Mangelia beata (Dall). Other new species described are Antiplanes profundicola and diomedea , Borsonella pinosensis, Propebela diomedea, profundicola and smithi.

It is a little difficult to study without the types or figures at this time. Dr. Bartsch states that the figures of these species will be published in his monograph.

****

The November 1 Bulletin of the Natural History Museum of San Diego is at hand. Among many other fine aquisitions in other departments is the following: " The Dept. of Mollusks follows with the largest total of individual items recently added from outside sources. Mrs. Clara K. Graham. of Ramona, alone donated 1310 shells. It took a trunk to bring them to the museum. She was a school teacher in Manila, P.I. for 17 years, and herself gathered the whole collection in her spare time. Included are many examples of superior size and color which make them especially desirable. From W.P. Cook of San Diego came 73 U.S. land and fresh water shells,and there have been several other smaller gifts to this department."

****

Mrs. L.O. Webb, Ohio, Illinois. " We have received the Minutes which have been sent to Glenn. I am saving them for him, he has been moved so often. At the present time he is in France and his address now is, Pvt. Glenn R. Webb, 35563804, 395th Signal Co. Avn., A.P.O. 126 c/o Postmaster, New York, N.Y. I am sure he would be pleased to hear from you. He enjoys letters. I send some magazines but so many things get lost it is discouraging for me as well as for him. He was sick during the summer and spent two months in the hospital. He never did say just what was wrong. We feel reasonably sure he was not wounded for we never received a notice from the government. We will be so glad to see the end of the war and have him safe at home. He is carrying on his snail studies, sends home his anatomy drawings by V mail. I wonder what the censor thinks. He has sent packages of snails. Some were alive and I am trying to keep them alive until he gets back. He sent some very old books that he picked up in Cambridge and Oxford. I am afraid he wont have much time in France to hunt snails or visit book shops. I believe he had a letter from Dr. Gregg. Under separate cover I am sending you one of his papers printed by Notre Dame . I will see that all of his things are taken care of. I am his mother. "

We all knew Glenn and enjoyed him while he was stationed in southern California. It is suggested that members write him in France. The latest publication referred to above is " The Mating of the Landsnail Haplotrema concavum (Say), The American Midland Naturalist, vol. 30, No. 2, pp 341-345, September, 1943/

Rev. Paul D. Ford, 160 W. 20th St., Erie, Pa. " Dear Mr. Burch; At last I can find time to sit down and write you a few lines. We are home from the Bahamas for a brief furlough. Perhaps we will be in the states for this winter. For the time being, I have accepted the pastorate of a large church in the city of Erie. So I am not at home at Sunbury, where my collection of shells are housed. But once in a while we make a trip to Sunbury. I brought home a very fine collection again from the Bahamas. Some very interesting shells that I have been receiving lately, have been from my son Reuel, in the U.S. Navy in the Pacific. For several months he was at Eniwetok. He sent me more than one hundred different species. Have been enjoying your " Minutes". Please have them note the change of address. They have been sending it to Nassau, but each time it has been forwarded back to me here at Erie. "

Mr. E.V. Edmonds, 922 N. Kingsley Dr., Los Angeles 27, Calif. We enjoyed a call recently and were more than happy to chat with " Eve" and get the news. Don has just returned to Los Angeles from Honolulu and is now serving at San Pedro. The last letter from Bob places him in Burma, India. That boy surely does get around. It seems almost no time ago since we had the priviledge of looking over a collection of land snails Bob made in northern Africa.

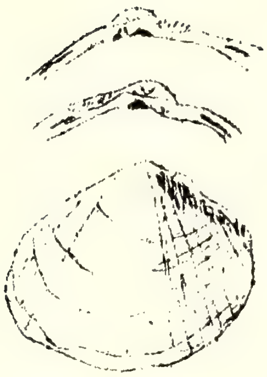
Albert Bauman, 6136 Lexington Ave., Los Angeles 38. We were sorry to have missed Albert when he called recently but were able to complete his file of the minutes.

Mrs. Faye B. Howard, 212 Locust St., Inglewood, Calif. Your editor feels definitely snubbed, and where is the staff of reporters etc. We have had no word of the recent trip to Mexico and the species of shells collected.

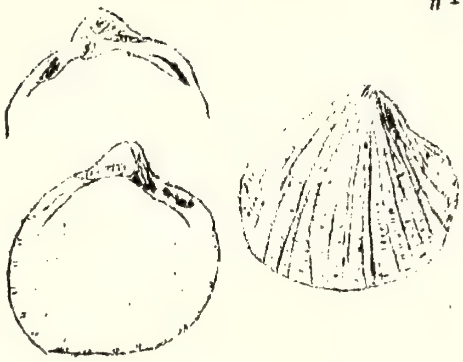
Jack Schmidt, 406 North K St., Lake Worth, Florida. We are happy to add Mr. Schmidt's name to our mailing list and will do what we can about back issues. " I would like to compliment you on your paper. It is most interesting, even to a perfect stranger, and presented so friendly. Maybe I'd better say total stranger, as I am anything but perfect. When I can find the necessary time to devote to it, I will try and exchange duplicates with some of your members. Thatm however, will not be very soon, but it will be eventually."

Fred C. Hadden, 2623 Pamoa Road, Honolulu 5, T. Hawaii. " ... wish also to thank you for the club minutes which I do find very interesting. I hope you w will continue to send them to me. I am very much of an amateur shell collect--or, and have studied sea shore life whenever I have had the opportunity. I had the nucleus of a collection started when the war started, but since then I have been working at Pearl Harbor for the navy and have not had the oppor--tunity to do any more collecting. Most of my collecting was done at Midway and Wake Islands before the war srarted. My studies of the growth of Tridacna gigantea and coral at Wake was, of course, interrupted by the capture of that island by the Japs. My favorite group of shells are the Cypraeidae. Enclosed please find my check for $5 to help defray expenses in publishing the minutes"

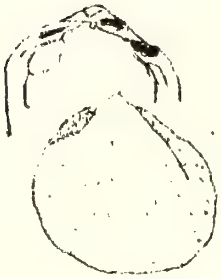
Mr. William K. Emerson, 2435 Bancroft St., San Diego 2, Calif. " You may re--call I sent what I believed to be specimens new to the faunal list of Miss--ion Bay to you early this year. These I labelled Mangelia hamata Carpenter. You called them Mangelia merita Gould. Miss Bristol and I again found my specimens comparable with specimens from the Lowe collection labelled Mangelia hamata Carpenter. Dr. Baily stated: Mangelia hamata Carp. 1865 and Cytharella merita Hinds 1843 are two separate genera- much alike- the difference being in the radula. As for the names; Mangelia merita Gould (?1850), Keep p. 263--- Mangelia hamata Carpenter , 1865, Keen Check List, not in Bull. 112 or Oldroyd --- Cytharella merita Hinds 1843 , Bull. 112, p 82, Oldroyd p 47, Keen Check List, not in Keep. From the above it would seem that the next step is to study the radulae. "



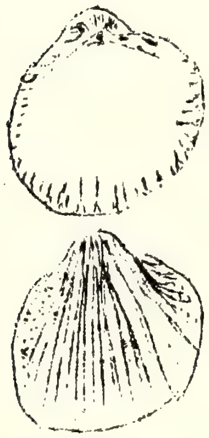
Serripes



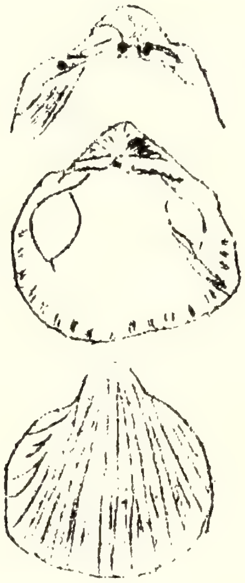
Clinocardium



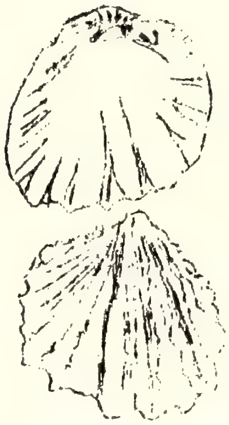
Laevicardium



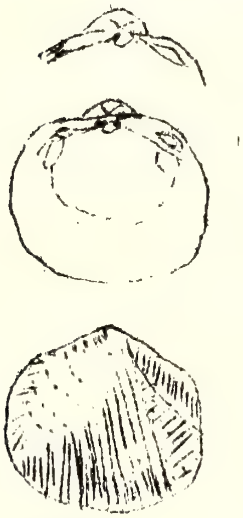
Trachycardium



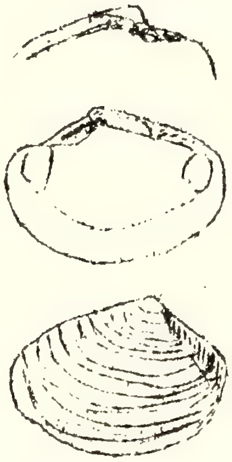
Americardia



Trigoniocardia



Nemocardium



Vesicomya

Additions and Corrections

Minutes #40- p 14

Kellia laperousii Deshayes - Seattle, King Co., & Port Orchard, Kitsap Co., Wash. Dutch Harbor, Aleutian Islands, Izhut Bay, Afognak Id., and Drier Bay and Thum Bay, Knight Id., Pr. Wm. Sound, Alaska; mostly found in empty clam shells. (W.J. Eyerdam).

Rochefortia tumida Carpenter- Minutes #40- p 15- Drier Bay, Knight Id., Alaska, 15 fms. mud, 1923 (W.J. Eyerdam).

Rochefortia planata Dall- Under rocks on reef.. Unalaska, Aleutian Id., 1932 (W.J. Eyerdam).

Rochefortia aleutica Dall- Minutes #40- p 15- Illuliak Bay, Unalaska, Aleutian Islands, dredged., mud., 1932 (W.J. Eyerdam).

Rochefortia pedroana Dall- Minutes #40- p 15- " I find in the current Minutes an interesting account of finding on Blepharopoda occidentalis Randall a Rochefortia sp. I collected species resembling your description on this sand crab at Pacific Beach, San Diego Co., In 1940 , they were common on the crustaceans near the Crystal Pier. Other B. occidentalis examined near mission Beach, Calif. possessed no shells attached to them. My specimens are white, with wrinkled , tan colored epidermis. I also have one complete Rochefortia sp. taken in sand at Coronado which is altogether different, and not identified. I understand Miss Edna Wilson has also collected Rochefortia from sand crabs from La Jolla, Calif. (Wm. Keith Emerson).

Pseudopythina rugifera Carpenter- Minutes #40- p 17- Port Orchard , Kitsap Co., Wash. Commensal on Gebia pugetensis. (W.J. Eyerdam).

Lasaea sp. - Minutes #40- pp 19-20. An interesting report has been received from our member Mr. W.J. Eyerdam reporting Lasaea rubra Montagu from Vancouver Island, British Columbia and Port Orchard, Kitsap Co., Wash. In sand in Mytilus beds. This is the most northern record of this genus on our coast and so listed in Bulletin 112. However, our decision was that we have Lasaea cistula and L. subviridis and do not have rubra. Therefore, it will be of interest to discover which of the two species Mr. Eyerdam has- or both.

Thyasira gouldii Philippi- Minutes #39- p 20- Set in the San Diego Museum of this label from Maine and Winter Harbor, British Columbia.

Thyasira barbarensis Dall- Minutes # 39- p 21- 1 valve from Carmen Id., Gulf of Calif. in H.N. Lowe Coll. in San Diego Museum.

Axinulus Verrill and Bush,1898. Subgenus of Thyasira. Minutes # 39- p 21.

It has been called to our attention that we ommited the type of this section. Dall, 1903, Trans. Wag. Free Inst. Sci. p 1338 gives Type Thyasira (Axinulus) brevis Verrill and Bush, Proc. U.S. Nat. Mus. xx, p. 790,1898.

Taras subquadratus (Carpenter)- Minutes # 39- p 24 Imperial Beach, Calif (Stephens); San Quintin, L.C. (Orcutt); Tepoca Bay, Sonora, Mex. (Lowe); Pta. Penasco, San Carlos Bay, Santa Maria Bay, Caremen Ids., San Benito Ids. Espiritu Santo , La Paz (Lowe).

Taras (Felaniella) sericatus (Reeve)- Minutes # 39- p 24 . Reported from 4 stations in Lower Calif., 5 from the lower Mexican coast, Salvador,Nicaragua Costa Rica, and Panama (Lowe).

Lucina (Lucinisca) nuttallii Conrad- Minutes # 40- p 6- Ensenada, & La Paz L.C. and Guaymas, Sonora, Mexico (Lowe).

Lucina (Epilucina) californica Conrad- Minutes # 40- p 7-8. San Felipe (Abbott Todos Santos Bay, L.C., Cedros Island (Lowe).

Lucina (Parvilucina) approximata Dall- Minutes # 40- p 8 . 30 and 35 fms. off Catalina Island, San Benito Islands in 10 fms., Magdalena Bay (Lowe).

Plectodon scaber Carpenter- Minutes # 38- p 14. 35 fms. Catalina Island (Lowe); 10 fms. San Benito Is, L.C. & 20 fms. Carmen Id., Gulf Cal. (Lowe).

Family CARDIIDAE

Genus Cardium Linnaeus, 1758. Type (by subsequent designation, Children,1823) Cardium costatum Linnaeus.

It is generally considered that Cardium s.s. is not represented in the fauna of this coast. Some authors have been disposed to place all of our species in various subgenera of Cardium. However, the consensus of opinion at this time seems to be to give them generic standing.

The members are by no means in accord on the proper taxonomy to follow with this group. Mr. George Willett made the following comments: " Am returning your manuscript with quite a number of notes on the different species. Regarding the Cardium group as a whole (that is, our west American species), excluding Serripes, our species appear to me to group more or less naturally as follows:

quadragenarium
nuttalli
ciliatum
californicum
fucanum
centifilosum

elatum
substriatum

procerum

biangulatum

If Cardium is to be discarded as a genus for our shells, my main criticism of your arrangement would be:

I see no good reason for recognition of Clinocardium as a full genus. To me, nuttalli, ciliatum, etc. are much more like quadragenarium than is procerum which you include with it, and the latter in hinge characters is very close to biangulatum. Also, it looks to me as though centifilosum is not more than subgenerically different from californicum or fucanum. If Cardium is not to be used- and you have plenty of good authority for not using it- I think I would prefer Grant and Gale's arrangement to yours, though I think they have procerum in the wrong place and I am not sure that biangulatum is more than subgenerically different.

The type of Cardium is superficially very different from any of our species, but in hinge and thinness of shell it is very similar to some of them. I admit that the continued use of Cardium may be regarded as a concession to convenience, but to me other arrangements so far proposed are so inconvincing as regards their taxonomic accuracy that I am continuing to follow Bull. 112, except in the use of Protocardia."

Genus Trachycardium Morch, 1853. Type (by subsequent designation, von Martens 1870), Cardium isocardia Linnaeus.

" Shell strongly ribbed and generally with numerous arched, recurved or denticulated scales on the ribs. The posterior slope has these scales much accentuated and may be the only area on the shell surface where scales occur. Shells in this genus are generally higher than long" (Clench & Smith-Johnsonia)

Subgenus Dallocardia Stewart, 1930. Type (by original designation) ,Cardium quadragenarium Conrad.

Dallocardia differs from Trachycardium s.s. " The cardinals are slightly posterior and the hinge seems to be the same as that of T. isocardia, except that it is not so heavy." (Stewart, Spec. Pub. #3, Acad. Nat. Sci. Phila. p234)
Trachycardium (Dallocardia) quadragenarium Conrad, 1837. " Santa Barbara,Calif. to Todos Santos Bay, Lower Calif. (Dall, 1921). Type Loc. near Santa Barbara

Collecting data: We have taken this species living in upper Newport Bay, Calif., the Estero below Ensenada, Mexico and have dredged it in many localities off the coast. It has an interesting habit of seeming to literally leap out of the sand immediately before the return of the tide. Collecting gets good just before you have to start running or swimming. The bathymetric range is rather interesting. We have dredged it plentifully off Redondo Beach in the 25 fathoms gravel and have also brought up young specimens only from as deep as 75 fathoms. It is odd that the young should seem to be taken in deeper water than the adults. We also dredged it off Avalon, Catalina Island in 25 fathoms and elsewhere along the coast of southern California. It is not uncommon in the San Pedro Pleistocene (Burch); off Pt. Loma and in Mission Bay (San Diego Museum); Mission Bay (W. K. Emerson).

Subgenus *Mexicardia* Stewart, 1930. Type (by original designation), *Cardium procerum* Sowerby.

Dall placed *C. procerum* under *Ringicardium* Fischer, 1887. Stewart says of this " Superficially *T. procerum* resembles *Ringicardium* ... but *T. procerum* has a heavier hinge and the cardinals are equidistant between the laterals while in *Ringicardium* the cardinals are close to the posterior laterals. The hinge and outline of *T. procerum* are similar to *Trachycardium*." (Stewart, 1930).

Trachycardium (Mexicardia) procerum Sowerby, 1833. Pleistocene of Baldwin Hills, Los Angeles County and San Diego. Range living by Dall " Cerros Island to Payta, Peru." This species is not of the Recent fauna of the California coast and should be ommitted . However, Dall listed it in Bull. 112.

Genus *Clinocardium* Keen, 1936. Type (by original designation), *Cardium nuttallii* Conrad.

" Shell medium to large, trigonal, oblique, usually ventricose; beaks recurved, prosogyrate; position of the umbones varying with age but usually at two thirds the distance between posterior and anterior ends of the shell; dorsal margin very broadly arched, sloping downward at an angle of about 25 degrees, ventral and anterior margins broadly rounded; epidermis closely adherent, brownish; sculpture of 28 to 55 rounded radial ribs and concentric growth lines which may cross the ribs as conspicuous loops, never as spines; lunule when present circumscribed , never impressed; escutcheon inconspicuous; ligament in dorsal view long, narrow and oval. Interior porcellaneous, ventral and anterior margins crenulate; hinge arched; cardinals in each valve slightly nearer anterior than posterior laterals; anterior cardinal of left valve stronger than posterior, recurved, posterior cardinal of right valve stronger than anterior, also recurved; ligament not elevated on a short shelly platform; beaks originating at a point slightly anterior to the anterior cardinals; muscle scars large; pallial line simple. Specimens arnge in length up to about 120 mm" (Keen, 1936, Trans. San Diego Soc. Nat. Hist., vol. 8, no. 17, pp. 119-120).

Dr. A. Myra Keen has sent us a key to our species of *Clinocardium*.

1. Ribs nodosely sculptured .... *nuttallii*
   Ribs not nodosely sculptured 2
2. Ribs heavy; posterior area with one or more flexuous furrows ....*californiense*
   Ribs not heavy; posterior area without flexuous furrows .. 3
3. Ribs more widely spaced on anterior third than on middle third of the shell .... *ciliatum*
   Ribs about evenly spaced on the anterior and middle thirds .. 4
4. Length of shell greater than height, valves not conspicuously ventricose, ribs about 45-50 in number .... *fucanum*
   Length of shell equal to height, valves ventricose, ribs about 40 in number .... *blandum*

Clinocardium blandum (Gould), 1850. Proc. Boston. Soc. Nat. Hist. vol. 3, p. 276. Type locality, Puget Sound, Washington.

The original description of this species which was ommitted from Bull. 112 and Oldroyd follows: " Testa parva, tenuis, subcircularis, vix transversa, ventricosa, postice subtruncata, cinereo-rufescens, costis planulatis radiantibus ad 40 insculpta, sulco angusto sejunctis, et liris concentricis tenuissimis, arcuatis, reflexis, decussatis: umbonibus medianis, tumidis, denudatis, eburneis: cavositas albida; margine interno crenulato; cardine debili. Long. 1; alt. 4/5; lat. 3/5 poll. Hab. Puget Sound."

Dr. A. Myra Keen (Personal Comm. Sept. 1944) states " The species C. blandum has been confused with both californiense and fucanum. It is distinct by reason of number of ribs, ventricosity, ovate outline, and deep channels between the ribs along the central area of the shell. I have seen the holotype in the National Museum and have studied a large growth series from Puget Sound. The characters seem to be constant with age. I have seem it living only from Puget Sound, but it did occur as far south as San Pedro in the Pleistocene. I can submit sample specimens if you find you have none; you may have it labelled fucanum."

Grant and Gale, 1931, placed the above species in the synonymy of californiense Deshayes.

Clinocardium nuttallii (Conrad), 1837. " Nunivak, Pribilof, and Commander Islands, Bering Sea, south to Hakodate, Japan, and San Diego, California, (Lower California ?) (Dall, 1921).

It is unfortunate that the name of this species must be changed. A host of collectors have sets labelled Cardium corbis Martyn.This has been the accepted name of this species from " time out of mind". However, there seems to be no doubt but that Martyn's names are in many instances too confused for explanation and use. An excellent discussion of this matter is given by Stewart, 1930, Spec. Pub. No. 3, Acad. Nat. Sci. Phila., p. 260.

Collecting data: We have collected this species common in Puget Sound near Port Orchard, Wash. It is not uncommon in Morro Bay, San Luis Obispo Co. We dredged it off Monterey, Calif. in less than 20 fathoms. Our most southerly record is Mugu, Ventura Co., Calif. where we took specimens in Jab 1941. It is not uncommon in some of the San Pedro Pleistocene deposits(Burch); southeast Alaska, common at low tide (G. Willett); reported by W.J. Eyerdam from " many places in State of Washington and British Columbia, and Alaska as far as Adak Island in the Aleutian Islands, also in the gulf of Kronotski and Avatcha Bay, Kamchatka. This species reaches its maximum size in the cold waters of Alaska. The following are a few large specimens of my collection:

Length	Width	Height
Afognak I. 100 mm	95 mm	75 mm
Sitkalidak I. 112 mm	108 mm	80 mm
Cordova 112 mm	110 mm	85 mm
Raspberry 125 mm	120 mm	74 mm.. 8 fms

But we have a recent note from Dr. A. Myra Keen of Stanford University in which she states " We have recently received a specimen of Clinocardium nuttallii larger than Mr. Eyerdam's record-sized specimens. This was collected on Atka Island, Alaska, by J.T. Barnaby, a member of the U.S. Fish and Wildlife Service, in 1941. Both valves are intact and in perfect condition. The measurements are: length, 145 mm, height 138 mm, thickness, 102 mm."

Other collecting records of this species are, Windfall Harbor, Admiralty Is., Alaska (Kate Stephens); Puget Sound (Hemphill); Orcas Id., 10-30 fms. (F. Baker); Japan (Anderson Collection); Morro and San Francisco Bays (Lowe Vancouver Island, B.C. (Baker).

Clinocardium ciliatum (Fabricius), 1780. " Circumboreal. Arctic Ocean and southward to Puget Sound and North Japan" (Dall, 1921). Johnson gives the Atlantic range " Greenland to Cape Cod, Mass." Type locality, Greenland.

Collecting data: Kukak, Alaska Pen. beach, Wrangel, 50 fms., Ketchikan, Alaska 20-40 fms. (G. Willett); Punuk I., Bering Sea, 15 fms., Prince Wm. Id., 18 fms., Frederick Sound 12 fms. (Lewis); Izhut Bay, Afognak Id... dredged sandy bottom 1922 (W.J. Eyerdam); Bering Id... 65 fms. clay, Vega Expd. 1879 (Eyerdam); Tromsosund, Norway and Hinchinbrook Id. dredged (Norberg)(Eyerdam);

Clinocardium californiense (Deshayes), 1841. " Japan, Bering Sea eastward to Sitka, Alaska. Type locality, Kamchatka.

There has been so much confusion about the differences between this species and C. fucanum that many of our collecting records are in question and the specimens in our collections should be studied again. The matter is stated by Dr. A. Myra Keen (Personal Comm. Sept. 1944) as follows:

" The species C. californiense is Asiatic in distribution and occurs no farther east than Sitka, Alaska. Most of the specimens I have seen come from Japanand the Bering Sea area. The type locality is Kamchatka, at least as indicated by the only specimen in the Paris Museum that seems to correspond with the original figure. The original description said " Cotes de Californie", which apparently was a bit of poetic license. The shell is much heavier than the west American form usually labelled " californiense", and the posterior slope, even in young specimens, has a peculiar undulating furrow in addition to the normal ribbing.

C. fucanum Dall is the common West American form, most abundant in Puget Sound, but ranging from Sitka, Alaska, to Monterey. Dall cites it from the Bering Sea, but I have not seen specimens from there. It is distinguished from true " californiense by its squarish ribs and rounded, shallow interspaces, especially on the middle third of the shell, where the ribbing is often faint. In the Pleistocene it ranged as far south as San Pedro."

Collecting data: In view of the above statement by Dr. Keen the following collecting records are given with the suggestion that most of the specimens involved will prove to be C. fucanum after further study. 5-20 fms. from Norton Sd., Bering Sea to S.E. Alaska, Forrester I., Craig etc. (G. Willett); San Juan I., Puget Sound (Lowe Coll.); Nemuro, Japan, (Dr. Fred Baker); many places in Puget Sound and in Alaska at Izhut Bay, Afognak I, Evans, Knight, Sitkalidak I. and Kodiak I. (W.J. Eyerdam)

Clinocardium fucanum (Dall), 1907. " Southern Bering Sea, off Unimak Island, and south to Monterey, Calif." (Dall, 1921). Keen " Abridged Check List" gives lat. 37 to 57. Type locality, Juan de Fuca Strait.

Collecting data: Dredged off Monterey, Calif. in 10,25 and 40 fathoms (Burch); Forrester Island, Alaska (G. Willett); San Juan Islands, Puget Sound. dredged (Dr. Fred Baker); Puget Sound (Oldroyd); Strait of Fuca, Victoria, B.C. and Sawmill Bay, Pr. Wm. Sound, and Sitkalidak I., Alaska (W.J. Eyerdam).

Two species reported only fossil were listed in Bulletin 112. Unless advised otherwise we shall not consider them as part of the Recent fauna of this coast. They are: Clinocardium decoratum Grewingk, 1850 from the Pleistocene of Alaska and British Columbia, and Clinocardium californiense comoxense Dall, 1900 from the Pleistocene of Vancouver Island.

Dr. A. Myra Keen advises us on this " I know of no Recent records of C. decoratum or C. comoxense".

Genus Trigoniocardia Dall, 1900. Type (by original designation) Cardium graniferum Broderip and Sowerby.

" Shell with the posterior slope sharply to moderately descending. Strongly ribbed, the ribs generally being somewhat smaller on the posterior slope. Channels between the ribs concentrically sculptured with fine thread like ridges. The anterior lateral teeth are crowded against the cardinals." (Clench and Smith- Johnsonia).

Subgenus Trigoniocardia s.s.

" Shell with posterior slope moderately descending, strongly ribbed and possessing concentric sculpture between the ribs; generally white or grayish on the outside, white or slightly colored with streaks or a blotch of reddish brown on the inside. Hinge having the anterior lateral teeth close to the cardinal teeth, the posterior laterals more distant." (Clench and Smith- Johnsonia).

Trigoniocardia (Trigoniocardia) eudoxia Dall, 1916. " Catalina Island to Gulf of California" (Dall, 1921). Type locality, Gulf of California.

This species is stated in full above. However, the species will be ommited from our permanent list. Dr. A. Myra Keen advises us about the two records of this species as follows (Per. Comm. Sept. 1944) " Trigoniocardia eudoxia Dall should be stricken from the list. The holotype, from the Gulf of California , is a young Trachycardium (Mexicardia) procerum. The specimen from Catalina Island recorded in Bull. 112 is at the National Museum; it is a Trachycardium of some sort, young, about 3 mm. in diameter, with 24 sharp ribs, bearing prickles on the posterior slope. It may be a ballast shell. The label carried no collecting data".

Subgenus Americardia Stewart, 1930. Type (by original designation), Cardium medium Linnaeus.

" Shell fairly heavy and generally blotched with brown or brownish red. Hinge having the anterior lateral and posterior lateral teeth about the same distance from the cardinal teeth." (Clenchand Smith-Johnsonia).

There has been some difference of opinion about considering Americardia and Trigoniocardia as separate genera. Dr. A. Myra Keen advises (Per. Note Sept. 1944) " Americardia looks like a good genus to me, but I hold no special brief for it if you prefer to subordinate it to Trigoniocardia." However, Stewart described it as a subgenus and it is used as a subgenus by Clench and Smith in Johnsonia. Dr. Joshua L. Baily Jr. writes " I say subgenus".

Trigoniocardia (Americardia) biangulata Sowerby, 1829. " San Pedro, Calif. to Panama" (Dall, 1921). to Guayaquil (Jordan 1924). Type locality, St. Elena and Isle of Plata, W. Colombia. to Redondo Beach (Burch).

Collecting data: Dredged in 10,25,35 fms. off Avalon, Catalina Island, Calif, also off Redondo Beach, Calif. in 25 fms. gravel, dredged off Punta Banda, Todos Santos Bay, Mexico and also dead valves taken littoralat Punta Banda and also on Catalina Island. In connection with the bathymetric range we hesitate to list one of 100 fathoms off Redondo Beach in which we brought up a number of dead valves but no living specimens. (Burch); Mission Bay, San Diego Co. (W.K. Emerson); Catalina Island in 30 fms. (Lowe Coll.).

Genus Laevicardium Swainson, 1840. Type (by subsequent designation) Stoliczka, 1871), Cardium oblongum Gmelin.

" Shell generally inflated, moderately thin, smooth to very finely ribbed, not gaping. Lateral teeth prominent and large, the anterior laterals being nearer to the cardinals. Cardinal teeth small but well developed." (Clench and Smith- Johnsonia).

Laevicardium elatum Sowerby, 1833. " San Pedro, Calif. south to Panama" (Dall Type locality, Gulf of California.

Collecting data: Dead valves are commonly washed in from the shallow off shore reef between Huntington Beach and Long Beach, Calif. It is common in many of the local Pleistocene deposits. However, I have never seen a specimen said to have been taken alive in southern California leaving the question that the specimens washed in are either fossil or subfossil. Mr. W. K. Emerson writes that it is found in a semifossil condition in San Diego Bay. Specimens from the Gulf of California are abundant and in most collections.(Burch). Reported from Corinto, Nicaragua by W.J. Eyerdam, 1938.

Laevicardium substriatum Conrad, 1837. Mugu, Ventura Co., Calif. south to Acapulco. Dall in Bull. 112 gave the range " Catalina Island and San Pedro south.." Cooper listed it " Monterey to South America". However, it is a southern shell and I have seen no specimens from farther north than our own collection at Mugu. Type locality, San Diego.

Collecting data: We found this species very common in the slough at Mugu, Ventura Co. which is an extention of the range as given of some 75 miles. It is not uncommon off Redondo Beach in water as deep as 25 fathoms. It is, of course, one of the most abundant species in such localities as Anaheim, Alamitos, Newport, Mission Bays on south to the Estero below Ensenada in our experience. (Burch).

Genus Serripes Gould,1841. Type (by monotypy), Cardium groenlandicum Bruguiere, 1789.

" Shell subcordiform, compressed, subequilateral; surface smooth or slightly radiately striate; beaks prominent; cardinal and lateral teeth obtuse, small, almost obsolete." (Tryon S.S. Conch.).

Serripes groenlandicus Bruguiere ,1789. " Circumboreal. Arctic Seas and south to Hakodate, Japan, and Puget Sound" (Dall, 1921). Johnson gives Atlantic range " Greenland to Cape Cod, Mass." and lists a subspecies protractus Dall.

Collecting data: Umnak I. to Petersburg, Alaska (G. Willett); Norton Sound, Bering Sea, 5 fms. , Kodiak Island, 13-15 fms., Frederick Sound, 12 fms. (Lewis); Izhut Bay, Afognak Island, Sawmill Bay, Port Huron, Sitkalidak Id., Alaska ... dredged in mud (W.J. Eyerdam); Hinchinbrook Id. and Tromsosund, Norway.. Ingvard (Norberg); Godhaven, Greebland.. coll. by Johann Moller .. Topotypes , Bering Island by Vega Exped. 1879, 65 fms. clay-sand (Eyerdam Collection);

Serripes laperousii Deshayes, 1839. " Bering Strait to Hakodate, Japan, and Sitka, Alaska" (Dall, 1921). Type locality, " Mers de California".

It has been our opinion that this is a West Coast species. However, Mr. George Willett of the Los Angeles Museum recently worked up some material from Greenland and found S. laperousii in it. Therefore it seems that both laperousii and groenlandicus are circumboreal.

Collecting data: Mr. George Willett informed us that this species is taken usually in shallow water. Reported, Kodiak Island, dead on the beach (G. Willett); Punuk I., Bering Sea, 18 fms., Nunivak I., Bering Sea, 8-10 fms., Prince Wm. Sound 18 fms., (Lewis); near Victoria, British Columbia, (Whiteaves); Kodiak, Woody and Raspberry Islands in the Kodiak group, collected by W.J. Eyerdam .. dredged on sandy bottom. Dimensions of the two largest specimens are as follows:

Length	Width	Height
110 mm.	85 mm	53 mm
120 mm	95 mm	60 mm

Genus Nemocardium Meek, 1876. Type (by monotypy), Cardium semiasperum Desh.

" Shell comparatively small, with fine ribs, the ribs of different character on the posterior part of the shell, being spinose, tuberculate, or cancellate instead of simple." (Grant & Gale,1931).

Dall placed the species involved here under the genus Protocardia Beyrich, 1845, and was, of course, followed by Oldroyd and others. Stewart in Spec. Pub. No. 3, ANCP, states of Nemocardium, " This genus is separated from Protocardia by the fine radiating ribs of the anterior region which are represented by the fine crenulations on the internal margin of the shell. In Protocardia this region has concentric ribs."

Dr. A. Myra Keen in " Abridged Check List" uses Nemocardium. Grant and Gale,1931, also used Nemocardium but considered it a subgenus of Laevicardium, a conclusion apparently not generally accepted.

Dr. A. Myra Keen (Personal Comm. Sept. 1944) says of this " In my revision of the Cardiidae, on which I have been working for about nine years now, I regard Nemocardium as a member of a different subfamily from Laevicardium. Naturally, I can't agree with Grant and Gale classification of this and Trachycardium as subgenera of Laevicardium. The species of centifilosum and richardsonii are not Nemocardium in the strict sense, but until a revision of the whole group is published, this is the best allocation available. The allocation to Protocardia, a Cretaceous genus, is definitely out."

Nemocardium centifilosum (Carpenter), 1864. " Bodega Bay to Lower Calif." (Dall, 1921). Type locality, Monterey, Calif.

Collecting data: We have found this species a very common dredged shell all along the coast recording it from off Monterey in 10-40 fms., El Segundo in 35 fms., Redondo Beach in 25-75 fms. , Avalon, Catalina Island in 25 fms., Santa Cruz Island in 50 fms., and off Ensenada, Mexico in 50 fms. (Burch); off San Diego, Calif. in 55 fms. (Dr. Fred Baker); San Pedro, Calif. in 20 fms., Catalina Island in 30 fms., Newport, Calif. in 30 fms. (G. Willett).

Nemocardium centifilosum richardsonii Whiteaves, 1878. " Queen Charlotte Islands, British Columbia to San Francisco" (Dall). Keen " Abridged Check List" gives lat. 38-55 which is from about San Francisco to Forrester Island, Alaska where it was taken by Mr. George Willett. Type locality, Straits of Georgia between Race Island, and Lighthouse and Victoria Harbor, British Columbia.

Collecting data: Mr. George Willett reported taking this species off Forrester Island, Alaska in 60-60 fms. but also comments " I can see no difference between this and the last except size." Mr. W.J. Eyerdam reports it from Strait of Georgia, B.C. ... Izhut Bay, Afognak Id. and Smith's Cove, Seattle, Wash. in mud 15 fms.

Family VESICOMYACIDAE

Genus Vesicomya Dall, 1886. Type, Callocardia atlantica Smith.

" Meiocardia but without lateral teeth; epidermis polished, umbones moderately prominent; lunule circumscribed by a groove; otherwise as in Meiocardia"(Dall

The treatment of this section is a little puzzling as used by some authors. For example Johnson in Mollusca of the Atlantic Coast uses Vesicomya as a subgenus of Pitar in the Veneridae. However, Dr. Joshua L. Baily Jr. advises that the consensus of opinion is against such usage.

None of the members report having specimens of this family.

Vesicomya ovalis Dall, 1896. " Clarence Strait, Alaska, 322 fathoms, and in Panama Bay, in 1,672 fathoms" (Dall).

Vesicomya lepta Dall, 1896. " Off Tillamook, Oregon and south to the Gulf of California in deep water." (Dall).

Vesicomya stearnsii Dall, 1895. " Off La Jolla, Calif. and south to the Gulf of California in deep water" (Dall).

Subgenus Archivesica Dall, 1908. Type, Vesicomya gigas Dall, Gulf of Calif. Mus. Comp. Zool., vol. 43, p. 418.

" Shell inflatedly modioliform, mesially slightly constricted, with the hinge plate short and broad and the hinge teeth radially disposed; lunule not circumscribed by an impressed line; pallial line without a sinus, but descending nearly vertically from the middle of the posterior aductor scar." Vesicomya (Archivesica) gigas Dall, 1896. " Off Point Sur, California, and in the Gulf of California in deep water." (Dall, 1921).

Dr. A. Myra Keen advises " Woodring, 1938, Prof. Paper, U.S. Geol. Survey no. 190, p. 50, places Calyptogena in the Vesicomyacidae also. Apparently the group is better regarded as of the Isocardiacea than of the Veneracea."

We discussed the genus Calyptogena under the Carditidae.

Additions and Corrections

The genus Nuculana was discussed in our Minutes # 33, pp 9-11. The following new species described by Mr. George Willett of the Los Angeles Museum should be added to the list.

Nuculana burchi Willett, 1944. Bulletin, So. Calif. Academy of Sciences, vol. 43, pt. 2, 1944, pp 71-73, Pl. 14, fig.3.

" Shell brownish or olivaceous, trigonal, oblong, rather flat; rounded anteriorly, bluntly pointed posteriorly; posterior dorsal margin slightly curved; beaks subcentral, not prominent. Exterior sculpture of flattened ribs with narrower interspaces; sculpture less arcuate than growth lines. Anterior teeth 20-22, posterior teeth about 15. Resilium triangular, short, projecting .

Type, right and left valves, No. 1066 Los Angeles County Museum. Type and 10 additional valves collected by John Q. and Tom Burch, in 50 fathoms off Redondo, California. Two additional valves taken 5 miles off El Segundo, Calif. The type right valve measures: long. 12.2, alt. 7.7, lat. 2.4 mm. The largest valve in the type lot (Burch coll.) measures 14x8.7x2.5 mm.

This shell is very similar to N. cellulita Dall, but differs from that species in flatter ribs and narrower interspaces, producing a smoother surface; and shorter and more projecting resilium. It is also proportionately more slender than cellulita, and no specimens seen are as large as adults of that species. Burchi differs from N. taphria in being flatter , with blunter posterior end, straighter posterior dorsal margin, and very much finer ribbing."

Periploma (Halistrepta) sulcata Dall, 1904. See Minutes # 37, p 12.

Among the shells dredged off Redondo Beach, Calif. by the Burches were specimens questionably allocated to the above species- from the 25 fathom gravel beds. Dr. A. Myra Keen recently examined one of them and returned the following note " .. The larger is more like P. (Halistrepta) sulcata Dall than anything else in the literature. It is evidently immature and is longer than the holotype of sulcata , with less regular concentric ridges, but otherwise conforms well with the figure and description."

We were rather disposed to think we had a new species, but will accept Dr. Keen's advice and leave the label sulcata, for the time being.

Minutes # 40- pp 9-10 - We have quoted so freely from Dr. Dall's great work in the Transactions of the Wagner Free Institute of Science of Philadelphia Vol. III, that we may ask to be excused if we occasionally run a quotation and fail to give the proper reference and place our quotation marks where they should be placed. The above pages contained such a case. We mentioned Dr. Dall at the bottom of page 9 but failed to give the reference from which it was copied. It was the above work Vol. III, pt. 5, pp 1114-1115.

New Publications Received

" New Species of Mollusks From Redondo, California" by G. Willett, Bulletin So. Calif. Academy of Sciences, vol. 43, pt. 2, pp 71-73, figs. 1-4, 1944.

Your editor begs pardon for seeming to brag but after all four new species in one paper is pretty good. Mr. Willett starts this paper with the statement " Among the many interesting mollusks dredged by John Q. and Tom Burch off Redondo Beach, California, the following appear to be new to science, and are here described."

The new species described are: Nuculana burchi, Volvulella tenuissima, Philine californica , and Melanella rosa.

" The Genus Modulus in the Western Atlantic " by R. Tucker Abbott, Johnsonia no. 14, Oct. 16, 1944.

" The Genus Columbarium in the Western Atlantic" by William J. Clench, Johnsonia, no. 15, Oct. 16, 1944.

" The Genera Casmaria, Galeodea, Phalium and Cassis in the Western Atlantic" Johnsonia no. 16 and by Dr. W.J. Clench.

With the above outstanding papers a note was inclosed from the editors in which they advise that they plan to complete the first volume of Johnsonia in about 300 pages and immediately start work on volume two. A title page, introduction and complete index will be supplied subscribers.

The Annual Report for the year 1943 of the Chicago Natural History Museum.

Several fine reports are included among the multitudinous activities of this great institution. Dr. Fritz Haas, Curator of Lower Invertebrates, is reported to be engaged in a revision of his divisions collections, with a by-product of taxonomic and other interesting notes.

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Major Hubert G. Schenck, of Stanford University is now in New Guinea, where he is in charge of a school for training Civil Affairs officers and men.

Mr. William G. Fargo, of Jackson, Michigan is now at his winter address, P.O. Box 874, Pass-a-Grille, Florida.

Dr. Sylvia Covert Shippey, 1022 Security Bldg., Long Beach, Calif. " My son is located on one of the islands of the Phoenix group in the So. Pacific. He has become quite interested in collecting shells. I understand you have pamphlets on shells in different areas. Will you mail him the ones that would be of the most interest to him. Am enclosing $1 to be applied on the cost as I would like to get the material as soon as possible. If you have books or articles you think would be of value let me know so that I may send them to him. Mail to Roderick A. Shippey, N.A.T.S. Pacific, Navy 1301, c/o Fleet Post Office, San Francisco, Calif."

It is a shame that we do not have some good publications covering the fauna of the central Pacific. We will send Mr. Shippey what we can but it will be very inadequate. If any of the members have any suggestions please let us hear them as we are being deluged with similar requests.

J.M. Dowdle, S 2/c, P.A.D. #3, Navy 167, c/o Fleet Post Office, San Francisco, Calif. We were delighted to have a long letter from Jack and also a recent photograph. The picture looks as if Jack has been sweating off not a few pounds. We hope not too many. " ... I never get time to do any live collecting. I havem however, done fairly well beach combing. Aside from some of the better known Cypraea and Conus, I haven't the figgiest notion just what I have. I am sending you a representative group and you can have the pleasure of identifying them. ... I have a quantity of material that I intend to give to the Club when I get back. It will be of interest because of locality, if for no other reason."

Jack is in New Guinea, and if he follows his interest in collecting small species should send back some interesting things.

A RANCHO LA BREA LANDSNAIL- Repeatedly the statement has been madd that there were no mollusca in the Rancho La Brea deposits. In a recent article Dr. Stock stated that fragments of mollusks had been found in the La Brea pits. About 24 years ago while visiting the Los Angeles Museum and talking with Mr. Lytle, vertebrate paleontologist, he told me about some snails which had been found with the La Brea fossils. When I seemed interested he offered to show them to me. On a shelf in one of the rooms where boxes of bones were stored were many small boxes and the first dozen or so he looked into contained small bones of birds and rodents. Then came a box containing fossil beetles and finally he opened a box containing three well preserved specimens of a land snail. The shells were stained dark brown as are the other La Brea fossils, They were of a size and form suggesting the genus Holospira, very different from anything now living in southern California. Holospira belongs to the Urocoptidae. It is a genus of Central America and comes north as far as southeastern Arizona and the extreme southern portions of New Mexico and Texas. It is not surprising that at a time when there were elephants, mastodons, camels, ground sloths and numerous other forms of mammals so diverse from our recent fauna, one should likewise find landsnails which are quite dissimilar from species now existent. However, the only other southern California Pleistocene landsnails of which I can find any record are Helminthoglypta tudiculata (Binney), Glyptostoma newberryanum (Binney) and Zonitoides arboreus (Say), all common forms in our recent fauna.

What happened to these fossil La Brea snails ? Where are they now ? To what species should they be assigned ? Is it extinct ? If still living, what is its present distribution ? Different members of the museum staff have been consulted on this matter but no one has offered any answers. - W. O. Gregg.

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RECENT PUBLICATION. " The Mating of the Landsnail Haplotrema concavum (Say)" by Glenn R. Webb. The American Midland Naturalist, vol. 30, no. 2, pp 341-345, September, 1943. This is an excellent illustrated article, of particular interest to those working on anatomy and physiology of terrestrial gastropods. W.O. Gregg.

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War Doesn't STop Glenn Webb- I have received a number of letters from Pvt. Glenn Webb, now serving with the armed forces " somewhere in France". In spite of the war, he still finds time between military duties to carry on his researches on mollusca. Of particular interest to me were letters recently received from him containing very fine drawings of anatomical parts of a slugwhich he has beenstudying, also data on his observations. This slug proves to be the same species as that introduced and now common in the San Francisco Bay region which, as pointed out by Dr. Pilsbry, is Deroceras panormitanum (Less. & Poll.). Formerly it has been confused with D. laeve. W.O. Gregg.

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LIVE MOLLUSKS NEEDED FOR RESEARCH- Extensive research on the schistosomiasis problem is being conducted at the National Institute of Health. It is now desired to obtain living specimens of Tryonia protea (Gould)(Paludestrina protea) as this form not only is very closely related to thh Asiatic Oncomelania but from available published data it has a similar ecology. I will be pleased to receive any information as to where living material of this species may be obtained. Any one who has opportunity to collect this species will greatly aid in this research by so doing. Living specimens may be packed in damp moss and sent directly to Dr. Eloise B. Cram, Senior Zoologist, National Institute of Health, Bethesda, 14, Maryland by air mail.

W.O. Gregg, 2200 S. Harvard Blvd., Los Angeles 7, Calif.

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MINUTES OF THE NOVEMBER MEETING OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIF.

The Conchological Club of Southern California met at the usual time and place Sunday, Nov. 5, 1944.

The meeting was called to order by the President, Mrs. E.P. Chace and, due to inclement weather, there were but 10 of the ' old guard' present.

The Nomenclature Committee reported two new articles on conchology by George Willett and Paul Bartsch, respectively, which will be reviewed elsewhere in the minutes.

The next meeting being the one scheduled for the annual election of officers, Mrs. Chace named as nominating committee, Morris Caruthers, John Q. Burch, and Irene Baker.

It was brought to the attention of the club that the December meeting would also be the occasion of the " Christmas Grab-bag Party".

Lest some of us have forgotten or have never attended such a session, all members or others who wish to attend, are asked to make up one or more Christmasy packages of specimens they may have in duplicate and think others might care to receive (No one should feel obliged to stay away, if they do not have such material for there will be packages enough for all). On arrival the packages are given to the " Grab Bag Custodian", usually Mr. E.P. Chace, who sees to it that all comers receive a package- not their own.

In talking of old times Mrs. Chace (the lady with a memory) reminded the other old-timers that Jan. 7 is the birthday of one of these, Morris Caruthers.

The study of Cardiidae was then taken up and despite sharp lightning and heavy thunder, much of interest was discussed and considerable difference of opinion aired and the small attendance did nothing to cause a lack of interest as all will discover who read the notes.

The meeting was duly adjourned. Effie M. Clark, Secretary.

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Jose A. Freire, Heredia 305, Santiago de Cuba, Cuba. As soon as our associate from Cuba gets that dredge working we predict some fine and rare material will be brought up.

Dr. W.O. Gregg, 2200 S. Harvard Blvd., Los Angeles 7, Calif. Your editor enjoyed a visit recently when Doc dropped in with some specimens of Tagelus collected several years ago in the Venice canal near Playa del Rey, Calif. After a great deal of discussion, comparison and consultation of the literature we decided that they were Tagelus affinis C.B. Adams. This is the southern species and so seldom taken up here that many have been disposed to challenge the reported range which is Santa Barbara south.

Mrs. E.L. Palmer, 206 Oak Hill Road, Ithaca, N.Y. We are honored to add this name to our permanent mailing list. Mrs. Palmer writes as " Katherine V.W. Palmer" and is the author of " The Veneridae of Eastern America, Cenozoic and Recent" and other fine papers.

Lieutenant John E. Davis, 0924078, Box 552, LVAAF, Las Vegas, Nevada. This is the latest address we have and dated Nov. 7.

Paul H. Reed, Publisher and Editor of Mollusca has mailed his No. 2 issue. One of our associates, Mr. C.L. Blakeslee, Mendon Center Road, Pittsford, N.Y. has a paper bearing the title " Collecting from the Grand River of Ontario, Canada" , and Dr. David T. Jones of the University of Utah, Salt Lake City has in this issue a clever little article bearing the title " Molluscan Perplexities".

Minutes of the Long Beach Shell Club

The Long Beach Shell Club met on Nov. 12. The program was an address by Dr. G.E. MacGinitie of the California Institute of Technology. We hope to have a detailed report for the next minutes.

The next meeting of the club will be on December 10.

Mr. and Mrs. James L. Goldie, 745 Gaviota Ave., Long Beach sent in a generous contribution to the expense fund of these minutes, and we are also glad to acknowledge the assistance of Miss Evelyn Davis , 270 Ravenna Dr., Long Beach (Head of visual education in Long Beach schools).

Dr. G.E. MacGinitie, 1201 East California, Pasadena, Calif. We are honored to add this name to our subscription list, something we should have done long ago. Frequent quotations from his fine works appear in our papers, and especially from " Ecological aspect of a California marine estuary", The American Misland Naturalist, vol. 16:5, p. 629.

Dr. Hazel Wentworth, 110 Mira Mar, Long Beach, Calif. is the new address of Dr. Wentworth.

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Argonauta pacifica Dall from San Pedro, Calif.

Miss Ruth E. Eaton, 326 W. 5th, Long Beach 2, Calif. sends in the following interesting note " I came across the statement in Minutes #31, p. 3 about Argonauta pacifica only having been found on the islands off shore. The finding of one containing the animal, inside the breakwater, near the museum at San Pedro certainly is a novelty isn't it?

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Exchangers please note- Mr. Harry C. Magnus, 510 43rd St., West Palm Beach Dr. A. Haven Smith, a fellow Rotarian with whom I have had the priviledge of exchanging some specimens, tells me of your Minutes etc. etc..... Perhaps you can put me in touch with some of your members who may be interested in exchanging."

Ted Dranga, 4340 S.W. 14th St., Miami 34, Florida. Thanks for the generous donation, Ted and we are sincerely flattered to have your note " The Minutes are most interesting and informative. Keep up the good work."

As probably all of us know, Ted Dranga is a dealer in fine shells. On a shell visit to a fellow collector we rather expect him to dig out some rarity of rarities or beauty of beauties with the comment " I got this one from Ted Dranga."

Homer V. Geib, 3064 Columbia St., San Diego 1, Calif. " Thanks for this month's notes and thanks for the pleasure and the information the notes bring to me each month of the year- information of the near and the present, and information from afar, of the enthusiasts who seem to be pursueing dilligently their conchological studies even in the few precious moments free from military duties. Have you heard of any nice things being brought back from the east or south Pacific ? So far, the natives seem to have turned the tables by swapping worthless ' cat eyes' for hard earned ten spots instead of Cypraea aurantias for glass beads. "

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The following appeared in last sunday's Los Angeles Times. I wonder. Will some one please try it and advise."DISCOVERY. They've found out how to make oysters open their shells all by themselves the moment you are ready to drop them into the stew. Get them drunk on carbonated water and they immediately relax and take a deep yawn. Quickly now, lift them out- all fresh as daisies. Dr. H.F. Prytherck of the Unites States Fish and Wildlife Service has spent 13 years experimenting, and the discovery is his. The plan is to develop a bicarbonate tablet to drop into water in which the oysters are immersed."

Miss Lillian C. Smith, 41 Walker St., Cambridge, Mass. We are honored to add the name of one of Dr. Clench's co-workers to our mailing list.

Dr. Jerome M. Schweitzer, 730 Fifth Ave., New York 22, N.Y. " Thank you for the minutes of your meeting. I am enclosing my check for $3 toward your good work. Please place me on your regular mailing list, and incidentally we would like to obtain specimens of Murex or Cypraea for our collection. We have a list of ours if desirable."

C.R. Mahaffey, 276 30th St., San Francisco 14, Calif. " I find your publication very interesting and after reading I mail them to the Inter-American University at Panama City."

Earle T. Gammon, Associate Economic Entomologist, State of California Dept. of Agriculture, Sacramento 14, Calif. " The monthly reports of the Conchological Club of Southern California have been received regularly. I appreciate very much receiving these reports."

Alabama Museum of Natural History, University, Alabama. We are happy to add the above name to our permanent mailing list.

Professor D.K. Greger, Fulton, Missouri. " I am at home for the duration. My family address is Fleet P.O. Frisco. They are all in the Navy but me and I can't even get a job " Deck Swabbing". I should be pleased to have your conchological paper and would like to belong to your society if you harbor Extra limitals."

Inasmuch as all of us that are left at home are in the same classification we will just assume that our friend Greger has been duly initiated into our circle.

Jose A. Freire, Heredia 305, Santiago de Cuba, Cuba. " The object of this letter is to let you know that I received the Minutes of the Conchological Club and I thank you very much. About the proceedure you said was needed for sending material to Cuba depends upon the place where you send it. I mean, if you send any package to Cuba from a city where there is a Cuban Consulate, you have to go thru all the red tape needed, but if in that city there is no consulate, then you do not have to bother about all the legal proceedures. I have a lot of correspondents who do not have to go thru all that trouble. I think that makes things clear and you may tell your friends so they will not be afraid to exchange with me. "

Permit the editor to state that Mr. Freire sends beautiful and first class material and any exchanger who fails to correspond with him does so to his own loss. And I think it is safe to state that the Cuban land shells are the most highly colored shells that live. Some of them start arguments with visitors who claim that they must have been painted or dyed.

Leslie Hubricht, 300 E. Plume St., Norfolk 10, Virginia. " The above address is my permanent address. I will be here for the duration at least. When I am moved out any mail sent to me at the above address will be forwarded. I have found about 40 species of land shells in Norfolk and vicinity including a half dozen introduced foreign snails. Helix aspersa occurs sparingly in the older parts of Norfolk and there is a species of Helicella not in Pilsbry's Monograph that is abundant in several sections of the city. I am enclosing a dollar to help cover the costs of the Bull."

W.H. Weeks, 508 Willoughby Ave., Brooklyn, N.Y. We were glad to have a note from our friend Weeks in which among other things he asks about collectors in Hawaii ".. ask if there are any collectors there now except Mr. Thaanum and who does not make exchanges. .." We call attention to the above hoping that Mr. Weeks will find another correspondent in Hawaii. Quite a bale of this little paper goes to Hawaiian collectors.

Miss Dorothy E. Holzman, 40 W. 72nd St., New York, N.Y. " I don't have much time for shells at present. Thank you very much for the minutes."

Mr. E.P. Baker, 417 S. Downey Ave., Downey, Calif. " Ned is at home with a broken leg and writes that he would like to study a few specimens of the genus Astarte. Perhaps some of the members can help him out. Ned writes that the leg is getting along better than expected though. We hope so.

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA

December 1944

The minutes and other publications of the Conchological Club of Southern California are not open to subscription. However, any of our friends interested in receiving them , may send us donations or stamps to help defray the cost of material and postage.

Any institution or library interested in filing those minutes is welcome to all available back issues and a place on our mailing list without charge. Students of particular problems are always welcome to ask us for specimens for study as well as all information we may have.

The next meeting will be hold January 7, at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. at 2:30 P.M.
We are now meeting the first sunday of each month.

Please mail all news about shells, shell publications, shell collectors, shell trips, localities etc. to your editor,

John Q. Burch,
4206 Halldale Ave.,
Los Angeles 37, Calif.

It is our intention to run in the next issue a complete list of all members and friends with their correct addresses and telephone numbers if any. Please also include your zone number if any. In connection with this list we propose to list the interests and all are urged to return to the editor at once a card or letter listing the numbers on the following list in which they are interested in addition to the information about their addresses.

1. World Wide Shells
2. Pacific Coast Shells
3. Marine Shells
4. Land and Fresh Water Shells
5. Buy Shells
6. Sell Shells
7. Exchange Shells
8. Buy Books
9. Field Collecting
10. Marine Life in General
11. Fossil Shells

In addition to the above numbered interests please send in any special interests.

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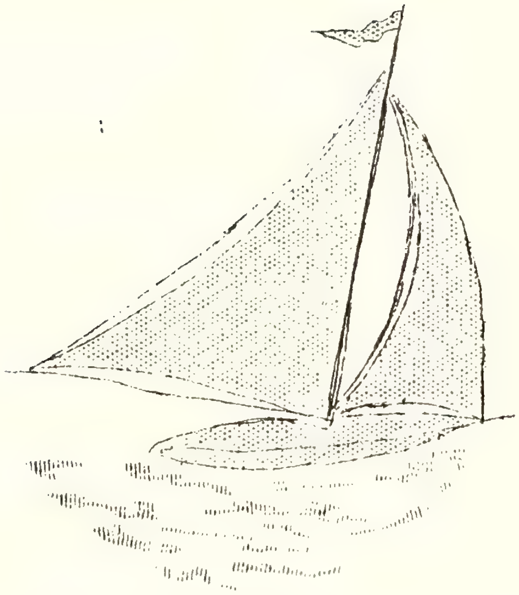
NEW PUBLICATION- " The Cenozoic Brachiopoda of Western North America" by Leo George Hertlein and U.S. Grant IV, Publications of the University of California at Los Angeles in Mathmatical and Physical Sciences- Vol.3, 1944.

This is the long expected work on our Brachiopoda in 236 pages with 21 pages of plates. Our Recent species are discussed at length and this work should by all means be in the library of every member. It will from now on be the first if not the last reference on this group.



SEASONS
GREETINGS

To all of our friends from the Burches, John, Rose, Tom, Beatrice, and John III.

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New Publications

" Oreohelix howardi, new species" by Dr. David T. Jones, Utah Academy of Sciences, Arts and Letters, vol. 21, pp 61-66, figs. A-E.

This is a very complete description of the species from Mill Creek Canyon, Salt Lake City.

" Report of the Committee on Marine Ecology as Related to Paleontology", 1943-1944, Harry S. Ladd, Chairman. This is a publication of the National Research Council, 2101 Constitution Avenue, Washington, D.C.

This well prepared booklet of 37 pages contains several very interesting reports on mollusks.

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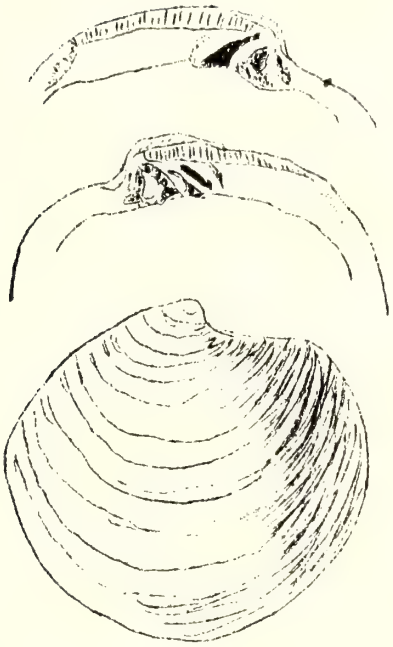
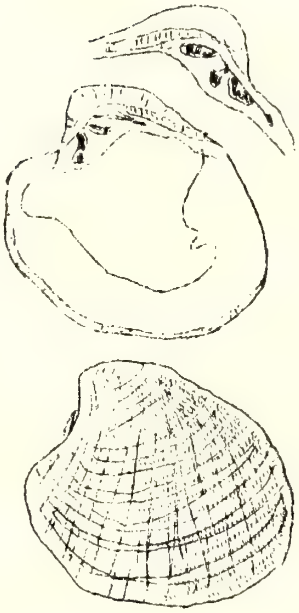
Mr. Robert H. Moses, 42 Pembury Road, Totenham, London, N. 17, England.

We have a very interesting letter from Mr. Moses as well as a nice box of fine shells from England which came through in perfect condition. This if the first box of specimens to reach us from across the Atlantic since the outbreak of the war. Mr. Moses has an extensive list of duplicates for exchange and especially those interested in European land and freshwater shells should write him. A few extracts from his letter follows " The long years of the war have knocked collecting on the head. Our sea coasts have been forbidden to visitors, and in fact everything has had the brake on. Our London branch of the Conchological Society has been unable to hold meetings; very happy evenings they were, and very helpful too; great tracts of London (right upt to the door of our meeting place) have been laid waste by the bombing and my own town, which is part of London, has suffered severely, one missile smashed through my own house and brought up right in the middle of my F.W. shells and Unionidae but by a miracle did not smash one that mattered."

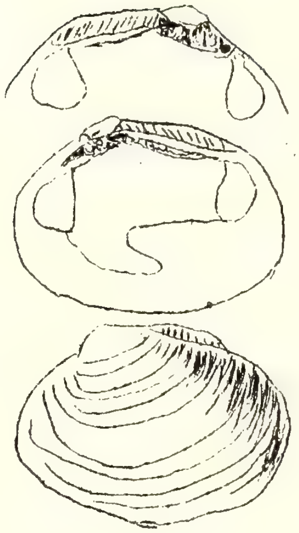
Mr. Moses offers to exchange now and it seems to be again possible.



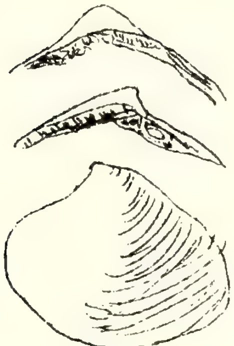
Dosinia



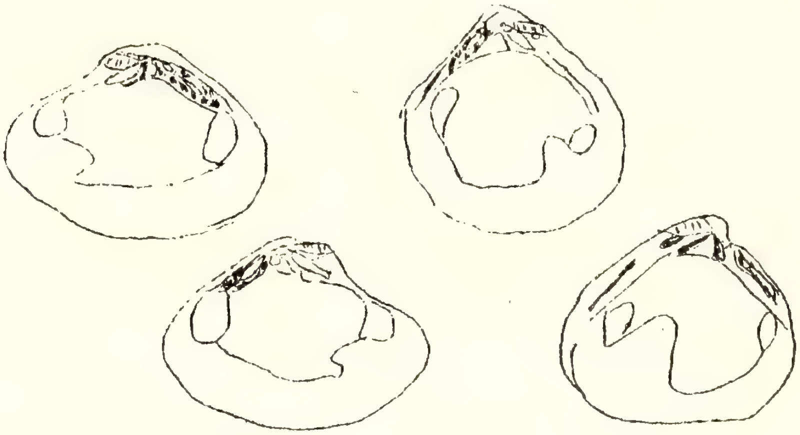
Ventricola



Saxidomus

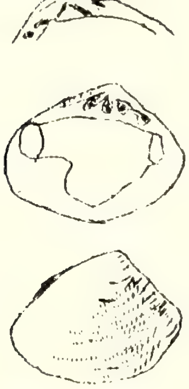


Pitar

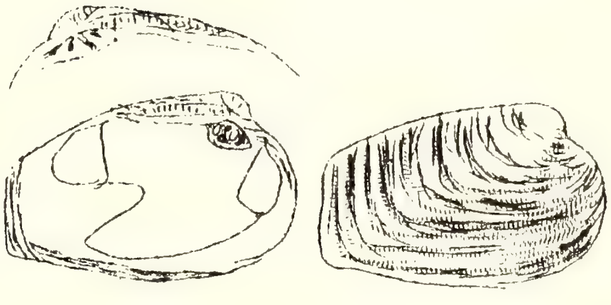


Tivela

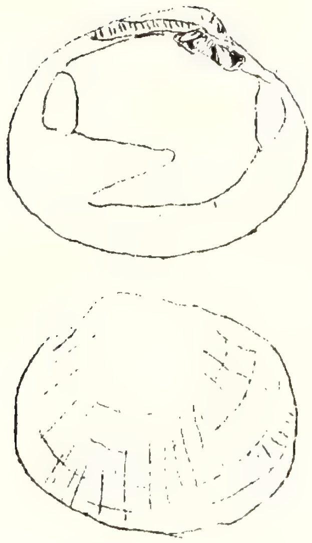
Gemma



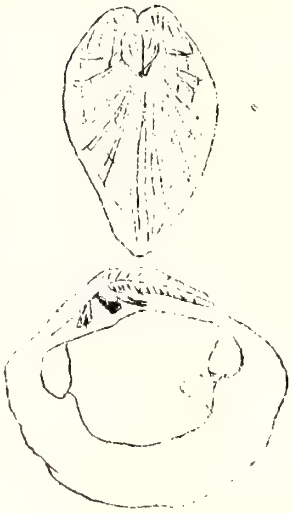
Transennella



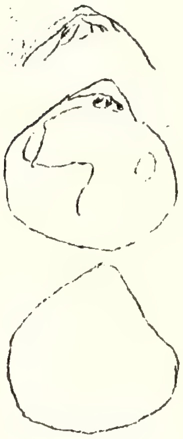
Irus



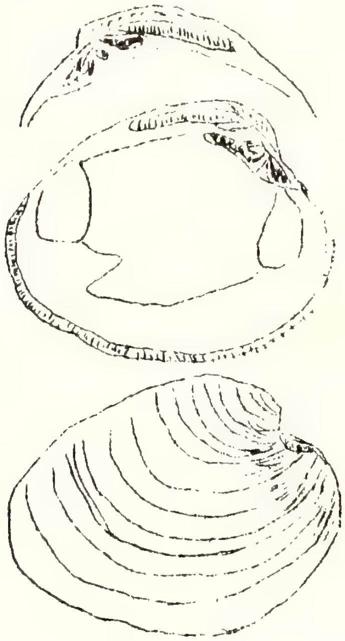
Protothaca



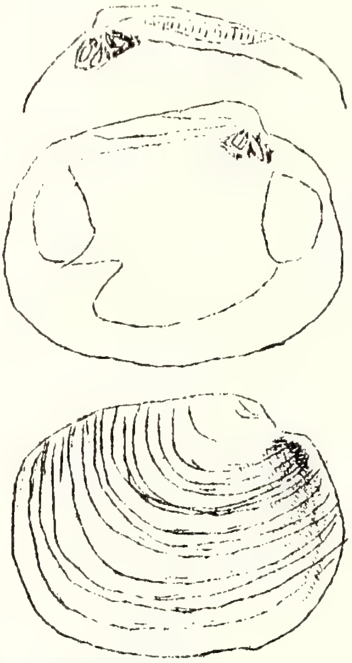
Chione



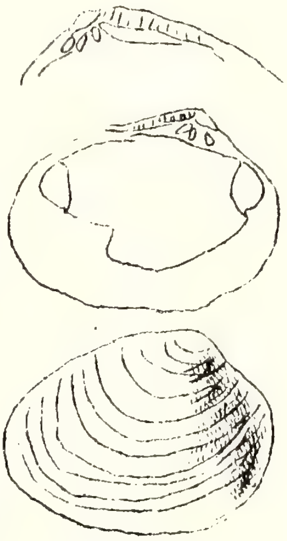
Psephidia



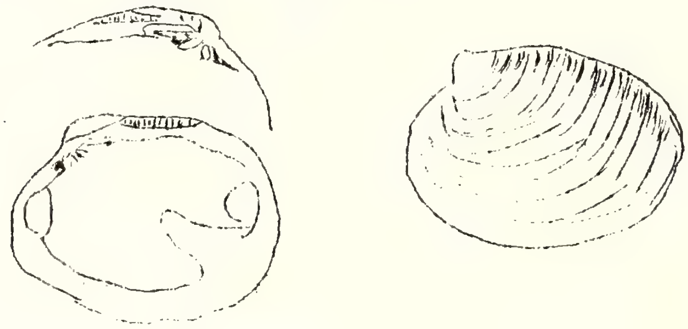
Mercenaria



Humilaria



Liocyma



Compsomyax

Superfamily VENERACEA

Cotton and Godfrey, 1938 in their fine work on " The Molluscs of South Australia" include some interesting and useful keys. The following key to families is from their work.

a. Shell closed, regular; hinge with or without laterals, three diverging cardinal, non-bifid, in each valve .... VENERIDAE

aa. Shell gaping behind, often irregular in form; hinge without laterals, two or three small bifid radial teeth in each valve .... .PETRICOLIDAE

Family VENERIDAE

This is one family on which there is no dirth of literature. A few of the works consulted follow.

Dall, W.H. " Synopsis of the Family Veneridae and of the North American Recent Species", Proc. U.S. Nat. Mus. 1902.

Dall, W.H. " Transactions of the Wagner Free Institute of Science of Phila." Vol. III, Part VI, 1903.

Palmer, Katherine Van Winkle " The Veneridae of Eastern America, Cenozoic and Recent", Paleo. Amer. 1927.

Stewart, Ralph B. " Gabb's Calif. Cretaceous and Tertiary Type Lamellibranchs" Spec. Pub. #3, Acad. Nat. Sci. Phila., 1930.

Grant and Gale, Mem. San Diego Soc. Nat. Hist. vol. 1, 1931.

Jukes-Browne, A.J. published a series of articles in the Proc. Malac. Soc. London vols. 9,10,11.

Frizzell, Don L. Trans. San Diego Soc. Nat. Hist. vol. VI, no. 21, 1931.

Cottonand Godfrey " The Molluscs of South Australia", 1938

Dall, Bartsch, Rehder " Marine Molls. of Hawaii, Bernice P. Bishop Museum, Bulletin 153, 1938.

It is quite obvious that a detailed discussion of the various classifications of this family would become a thesis of a size impossible in our discussions. It is therefore suggested that we follow Dall unless the evidence against such usage is too preponderant. Some of Dall's nomenclature will have to be changed.

Genus Dosinia Scopoli, 1777. Type (by monotypy), Chama dosin Adanson -- Dosinia africana Hanley.

" Shell orbicular, generally compressed, with a long and strong ligament seated in a groove and enfolding a heavy resilium; lunule small, impressed; escutcheon narrow, nearly linear, or absent; hinge plate broad and thick; right valve with two anterior laterals and four cardinals but the posterior cardinal , being extremely thin, is often broken off, eroded, or obsolete; left valve with one anterior lateral and three cardinals; valve margins smooth; pallial sinus rather long and usually acute; sculpture generally of elegantly concentric grooves and interspaces, sometimes raised into lamellae at the borders of the lunule and escutcheon, crossed rarely with weak radial threads; colouration rarely disposed in patterns, and usually pale, many species being white; periostracum nearly always thin and polished" (Cotton and Godfrey, 1938).

Subgenus Dosinidia Dall, 1902. Type , Venus concentrica Born.

" Valves suborbicular, more or less compressed, white, with a sculpture of concentric grooving, the interspaces never lamellose; furnished with an obvious periostracum; lunule small, impressed; escutcheon absent: pallial sinus ample, ascending, angular in front; middle cardinals broad, sulcate or bifid, anterior lateral small, feeble, smooth" (Dall, 1903).

Dr. Dall placed all of our Recent Central American and West Indian species in this subgenus, or section in his usage.

Dosinia (Dosinidia) ponderosa Gray, 1838. " San Diego, Calif. and south to Payta, Peru" (Dall, 1921). Orcutt listed it from San Pedro south.

Practically all faunal lists place the northern end of the range of this species at San Diego. Of course, it is a common species in the Pleistocene deposits, but I have never seen a Recent specimen said to have been collected near San Diego, much less San Pedro. The California record is open to such question as to be disputed unless verified.

Genus Tivela Link, 1807. Type (by subsequent desig. Dall, 1902), Venus corbicula Gmelin (V. mactroides Born).

" Shell porcellanous, smooth, sometimes heavy, trigonal, with prominent beaks and short but stout ligament; hinge with three radiating cardinals in each valve, an anterior lateral in the left valve and a corresponding socket in the right valve, but the teeth variable, sometimes with accessories; pallial sinus distinct, short or long."

Subgenus Pachydesma Conrad, 1854. Type, Donax stultorum Mawe.

" Shell very large and ponderous, with smooth interior margins and a thick vernicose periostracum; hinge with four cardinals in each valve" (Dall

Tivela (Pachydesma) stultorum Mawe, 1823. " Half Moon Bay, San Mateo Co., California to Lower California " (Grant and Gale, 1931).

The older lists used the name crassatelloides. Stearns, R.E.C. in 1899 published a paper " Notes on Cytherea (Tivela) crassatelloides Conrad, with Descriptions of Many Varieties". And Dr. Stearns certainly meant it. He described 16 varieties in this one paper. They were all based on color or other minor variations.

Collecting data: Few of us but have enjoyed fried Pismo Clams in many localities. We find them in shallow water in open surf, never in stagnant lagoons. It is odd that this species seems to be found in certain sections so much larger and finer than in others. They are large and common enough to be of commercial importance in San Luis Obispo County, Oceano, Pismo on up past Morro Bay. From there south while an occasional specimen may appear it is not really common again until we reach Todos Santos Bay. (Burch).

Genus Transennella Dall, 1883. Type (by monotypy), T. conradina Dall.

" Shell small, having the general form and coloration of Tivela, but a hinge with three cardinals in each valve, the middle left cardinal bifid, and an elongateleft lateral received into a socket in the opposite valve; the hinge has no rugosities, the lunule but not the escutcheon is defined internal margins sharply tangentially grooved with numerous sulci; the pallial sinus angular, free, obliquely ascending" (Dall).

This genus differs from Psephidea in the presence of an anterior lateral tooth in the left valve.

Transennella tantilla (Gould), 1852. " Sitka Harbor, Alaska and south to Lower California" (Dall). Type locality, Pliocene of Kettleman Hills, Calif.

Specimens of this species are white with splotches of brown on the posterior portion of the shell.

Collecting data: Dredged in great abundance off Monterey, Calif. on shale bottom in 10-20 fms., collected littoral at San Simeon, Calif., Cauyocos specimens taken from the backs of Haliotis rufescens brought into the market at Morro Bay, San Luis Obispo Co., also taken in Morro Bay proper, and not uncommon all down the coast to El Morro Point, Ensenada, Mexico(Burch); Santa Cruz, Catalina and San Martin Islands (G. Willett);

Genus Amiantis Carpenter, 1863. Type (by monotypy), Cytherea callosa Conrad.

" Shell large, solid, ovate, concentrically waved, with vernicose periostracum; lunule and a linear escutcheon defined by an impressed line; inner margins smooth; pallial sinus ample, acute in front, free below, slightly ascending; three cardinals in each valve, the anterior one very thin, anterior laterals large and strong." (Dall, 1903).

The name Amiantis has been the source of a great deal of discussion. It was originally described as a subgenus. Dr. Joshua L. Baily Jr. (Per. Comm. Nov. 1944) states the opposition very well as follows: " The subgenus Amiantis I do not think to be worthy of generic rank. It was formerly included under the genera Cytherea or Callista. Certain nomenclatorial artists have put these two names on the index expurgatorius, so that it becomes a matter of expediency to raise the subgenera under them to the rank of genera. The case of Humilaria is somewhat parallel, but not exactly. The systematic position of this group seems to be uncertain and until we know more about it, it seems wiser to make a genus of it than not."

Amiantis callosa (Conrad) ,1837 " Santa Monica, Calif. (Weymouth) to Gulf of Tehuantepec, Mexico" (Grant and Gale, 1931). Dall gave the range San Pedro south.

Collecting data: The habitat is just below the low tide line on sandy bottoms in the open surf. There have been several efforts to plant this species in the bays without success. Sam of Anaheim Bay planted great numbers of them. They all died very soon.

Dredged off Santa Monica, Calif., also at Malaga Cove, in shallow water not over 7 to 10 fathoms. Very abundant along the stretch of beach between Seal Beach and Huntington Beach, Calif. being washed in alive by the thousands after storms. The same condition exists along the beach south of Ensenada, Mexico (Burch).

Genus Pitar Romer, 1857. Type (by monotypy), Venus tumens Gmelin.

" Shell subtrigonal or ovate, convex, solid, smooth or concentrically sulcate or waved; pallial sinus ample, deep, reaching the middle of the shell, moderately ascending; hinge with a well developed anterior lateral , the posterior cardinals often grooved; lunule not deeply impressed, bounded by an incised line, escutcheon not limited or well defined ; internal margins smooth. (Dall, 1903).

Dr. Dall renamed this species Pitaria in 1902 on the grounds that Pitar is a vernacular African word and not entitled to be used without Latinization. Quite a lot of ink has been wasted in argument about this, and it has been generally rejected and Pitar as originally proposed accepted. The storm was briefly about the rules stated as follows " The scientific names of animals must be words which are either Latin or Latinized, or considered and treated as such in case they are not of classic origin" Art. 3, Int. Rules Zool. Nom. Ralph B. Stewart and most other writers feel that the name Pitar while not Latin or Latinized comes under the " considered and treated as such" part of the rule.

Pitar newcombianus (Gabb), 1865. " Monterey, Calif. to the Gulf of Calif. and Clarion Island " (Dall). Type locality, Catalina Island, Calif. in 100 fms.

Collecting data: Catalina Island, in 30 fms. and South Coronado Island in 15 fms. (G. Willott); dredged off Catalina Island, in 35 fms. 8/1937(Burch

Pitar ida Tegland, 1928. (Nautilus, vol. 42, no. 1, pp 4-5, July, 1928) Type locality, Sitka, Alaska. The shell was originally identified as Marcia oregonensis.

In the preliminary discussions of this group the following query was made by John Burch with an amusing conflict of opinions on the matter.

" Will one of our Latin scholars give this matter a thought, and please advise me. I find Pitaria newcombiana which I am changing back to Pitar and note that Grant and Gale have Pitar newcombianus. And ida was described as Pitaria ida. What happens to ida if anything?" But my Latin scholars failed to agree

Dr. Joshua L. Baily Jr. comments " You ask some Latin scholar to enlighten you as to the gender of the name *Pitar*. Unfortunately the name is not Latin, nor is it Greek. I believe it is Hottentot. Anyway authorities are disagreed as to whether the specific name should be in the masculine or the feminine form. The specific name *ida* suggests that this species was named after Mrs. Oldroyd, and since there is no doubt as to her gender, I would suggest not altering it". George Willett very briefly " Let it stand". But Dr. A. Myra Keen states " *Pitar ida* should be emended to *Pitar idae*, since Tegland states it is named for Ida Oldroyd.".

Genus *Antigona* Schumacher, 1817. Type (by monotypy), *Antigona lamellaria* Schumacher.

" Shell similar to that of *Chione*, but with a small part of the anterior cardinal in the left valve separated off into a pseudolateral, and a corresponding pit in the right valve" (Grant and Gale).

Subgenus *Ventricola* Roemer, 1857. Type, *Venus rugosa* Gmelin.

" Shell large with strong, distant, evenly spaced concentric lamellae, between which are smaller concentric threads; pallial sinus small, angular, lunule deeply impressed; right part of the escutcheon obsolete" (Dall,1902).

Antigona (Ventricola) fordi (Yates) , 1890. " Monterey, Calif. to Lower California. Panama? " (Dall). Type locality, Santa Barbara, Calif.

Collecting data: Dredged off Catalina Island in 25 fms., off San Pedro in 20 fms. sand bottom (G. Willett); dredged off Monterey, Calif. in 40 fms. and also in 20 fms. shale 8/1940, abundant off Redondo Beach, Calif. in 20 to 30 fms. sand bottom/. In the Redondo Beach dredgings the species seems to prefer the coarse red sand although occasional specimens came up from the gravel. We failed to find it in any of the deeper dredgings. Dredged in 25 fms. off Avalon, Catalina Island, off Point Loma, San Diego Co. Occasional specimens are thrown up on the beaches after storms but the habitat is obviously in several fathoms off shore. (Burch); reported from Point Loma, San Diego Co. by Mr. W.K. Emerson.

Genus *Saxidomus* Conrad, 1837. Type (by monotypy), *Saxidomus nuttalli* Conrad

" Shell equivalve, gaping posteriorly; hinge with from four to five compressed cardinal teeth in the right valve; in the left valve, four; muscular impressions two, large, rounded; pallial impression with a profound sinus"

Saxidomus nuttalli Conrad, 1837. " Humboldt Bay, Calif. to Lower Calif., San Martin Island (Baker) (Grant and Gale, 1931). Type locality, San Diego (Oldroyd.

The specific name *nuttalli* is the correct spelling according to Dr. Myra Keen and not the *nuttallii* of Dall, Bull. 112, Oldroyd etc.

Collecting data: Our experience has been that the normal habitat of the adult of this species is several fathoms off shore although good specimens are frequently thrown up on shore. We have dredged it as deep as 25 fathoms off Redondo Beach, 10-20 fms. off Monterey, Calif. An interesting feature of this species is that the young are often striped and are colored black on the posterior third of the shell. This coloration evidently dissapears with age. When taking the first juveniles of this species the collector is almost certain to think that he has something different. Mr. W.J. Eyerdam recently sent us for study a striped specimen of the northern species *giganteus* which he had taken in Puget Sound, Port Orchard I believe. Immature specimens are common enough in the sloughs. A large colony inside Newport Bay on the landward side seems to produce specimens about half the normal adult size or is it possible that the food supply and environment of the open water simply develops larger specimens ? (Burch).

Saxidomus giganteus Deshayes, 1839. " Aleutian Islands from Attu eastward and south to Monterey, California" (Dall, 1921). Type locality, "Californie"

In the discussion of this species John Burch made the following statement which did not meet with the approval of the majority, " Grant and Gale, 1931 make this species a subspecies of nuttalli. In my opinion this is good proceedure. While it is possible to separate the extremes with ease it is also true that certain specimens from Puget Sound and northward, especially immature specimens , if mixed with a lot of southern nuttalli would be impossible to separate again. Therefore subject to correction I propose that the name S. nuttalli giganteus (Deshayes) be used." However, we will retain the two specific names, accepting Mr. George Willett's advice which is " I have not seen adults that intergrade."

Collecting data: Collected by W.J. Eyerdam at many stations in Puget Sound, Alaska and the Aleutian Islands. It is our most common and best food clam. Specimens taken from Raspberry Strait, Raspberry Island, Alaska have a reddish brown stained shell, probably due to inorganic matter in the mud. The two largest shells in my collection are:

No. 2584.. length .. 110 mm.. width 90 mm.. Seldovia, Alaska
No. 2157.. length .. 120 mm.. width.. 100 mm.. Mud Bay, Thurston Co., Wash.

Saxidomus giganteus brevis Dall, 1916. " Admiralty Island, Alaska, to Tacoma Wash." (Dall). Type locality, Mole Harbor, Admiralty Islands.
" New variety brevis. Shell short, subtriangular, small in comparison with type and much less elongated. Length , 60; height, 50; diameter 33 mm" (Dall)

Collecting data: We have specimens labelled brevis from the north given us I think by Dr. Fred Baker. They seem to be of slightly different outline but still very obviously the species. My vote is to abandon brevis to the synonymy." (Burch). O.K. (George Willett).

Genus Chione Megerle von Muhlfeld, 1811. Type (by subsequent designation, Gray, 1847) Venus dysdera Chemnitz ** Venus cancellata Linnaeus.

Grant and Gale, 1931 reduce Chione to a subgenus of Venus and on pp 317-18 make some very interesting comparisons of Venus verrucossa L. (type of Venus) and V. cancellata. It must be admitted that with the two shells in hand, Grant and Gale make rather a good case. In the discussion of the above statement Mr. George Willett commented " I think so too.". However, Dr. A. Myra Keen stated " I believe Frizzell's work on the Veneracea will stand the test of time better than that of Grant and Gale. Notice his discussion on p. 65 with regard to the relationships of Chione and Venus."

We will therefore stay with Chione until more evidence is presented.

Chione fluctifraga (Sowerby), 1853. " San Pedro, Calif. to the Gulf of California" (Dall). The type locality of this species is stated as Australia even though obviously illogical. Dr. A. Myra Keen advises on this matter " The stated type locality of Chione fluctifraga (Sowerby) is Australia , which either is an error or subsequent revisers have misidentified the West Coast form with Sowerby's figures."

Collecting data: This is not the common species in Anaheim and Newport Bays, Calif. but neither is it rare. Undatella in our experience is the common form. However, in the Estero below Ensenada, Mexico, fluctifraga seems to be the predominant species and attains a greater size than any of the genus I have ever collected in this section. (Burch).

Chione undatella(Sowerby), 1835. " San Pedro, Calif. and south to Guayaquil" (Dall). Mugu, Ventura Co. (Burch) Type locality, Gulf of California.

Collecting data: The inlet at Mugu, Ventura Co., dredged in 10 to 25 fms. off Redondo Beach, and abundant in all sloughs southward such as Anaheim, Alamitos, Newport Bay, Mission etc. to the Estero south of Ensenada.

Chione californiensis (Broderip), 1835. (*C. succinta* Valenciennes).
" Mugu, Calif. to Panama" (Dall).

Collecting data: Mugu, Ventura Co., dredged in 15-25 fms. off Redondo Beach, off Avalon, Catalina Island, and common in the sloughs as well as the beaches down the coast to Ensenada in our experience (Burch).

Discussion- Dr. A. Myra Keen (per. comm. Nov. 1944) states " *Chione succinata* (Valenciennes), 1832, which was described as a *Venus* , is a primary homonym of *Venus succincta* Linne, 1771. The next available synonym is *Chione californiensis* (*Broderip*) . I have checked this matter very carefully. The *Venus succincta* Linne is not our West Coast shell." We have accepted the advice of Dr. Keen on this problem.

Grant and Gale, 1931 place *undatella* in the synonymy of *C. succincta* , the species we are calling *californiensis*. In discussing this matter John Burch stated " It is my opinion that the two species can be definitely distinguished not only by the coarser and more distant sculpture of *californiensis* but also the habit of *californiensis* as Dall states " the ribs of the middle of the lower half of the disk generally are thickened and flattened, showing a polished surface which nearly covers the interspaces" . Mr. George Willett comments " To me , *succincta* and *fluctigraga* are more alike than are the former and *undatella*."

Genus *Venus* Linnaeus, 1758. Type (by subsequent designation Gray, 1847), *Venus verrucossa* Linnaeus.

The type of the genus *Venus* has been the subject of extensive debate . Dall used *Venus* with type *V. mercenaria* L. However, the statement above seems to be very generally accepted at this time.

Dr. Joshua L. Baily Jr. (Per. Comm. Nov. 1944) comments " Stewart designated *Venus verrucosa* as the type of this genus, but he acknowledged that there was an earlier designation, of *Venus dione*. His reason for not recognizing this earlier designation was that it would cause too much confusion if the shift of names was made. It seems to me that this argument would apply equally well to *Venus verrucosa*, and that it would be better to use *Venus mercenaria* for the type. The objection to this course of action is that nobody else would agree with me.

I think Grant and Gale are quite right in making *Chione* a subgenus of *Venus*."

Subgenus *Mercenaria* Schumacher, 1817. Type (by monotypy), *Mercenaria violacea* Schumacher -- *Venus mercenaria* Linnaeus.

" Shell large, heavy; radial sculpture absent, concentric sculpture of fine growth lamellae or striae."

Venus (*Mercenaria*) *kennicottii* Dall, 1871. " Neah Bay, Washington, to Little River, Mendocino County, Calif." (Dall, 1921).

Grant and Gale, 1931 state " *V. kennicottii* Dall from Washington is so similar to the Atlantic *V. mercenaria* that the two are very difficult to distinguish; and the fact that it is very rare suggests that it may have been founded on adventitous specimens of the latter".

Genus *Humilaria* Grant and Gale, 1931. Type (by original designation) *Venus kennerlyi* Carpenter in Reeve, 1863.

" Shell rather large, ovate-quadrate, flattened, beaks anterior; sculptured with fine concentric lines and periodic sharp lamellae but no radial sculpture; pallial sinus rather short, angular, but abruptly rounded at apex; anterior extremity of hinge buttressed just above the anterior adductor scar; valve margins crenulated or smooth." (Grant and Gale, 1931).

Dr. A. Myra Keen (Per. Comm. Nov. 1944) advises " I still feel that Humilaria is a good genus. The only very closely related group, so far as I can discover from a study of our collection, is Samarangia Dall. Would it make anybody happier to write it Samarangia (Humilaria) kennerleyi ? "

Note- Dall placed kennerleyi under the genus Marcia H. and A. Adams, 1857. Ralph B. Stewart (Spec. Pub. #3, A.N.S.P.) p. 221 seems to have been the first to discuss the confusion of types of Marcia. His conclusions were followed by Grant and Gale, 1931, p. 325. However, Grant and Gale accept Venerupis for the entire group and described Humilaria as a subgenus of Venerupis. But Venerupis s.s. seems to be such a distinctly different thing that it is difficult to consider kennerleyi in the same genus. We will, therefore follow Dr. Keen in giving Humilaria generic value.

Humilaria kennerleyi Carpenter in Reeve, 1863. " Kodiak Island, Alaska, to Carmel Bay, California " (Dall, 1921). Type locality, Puget Sound.

Collecting data: Prince William Sound, Alaska, 18 fms. (Lewis); Ketchikan, Forrester Island, 20 fms., Craig from low tide to 20 fms. (G. Willett); shore specimens are much smoother than dredged ones (G. Willett); Izhut Bay, Afognak Id., Sitkalidak Island, Alaska 1922 and 1931.. San Juan Id. 1920.. dredged in sandy mud by W.J. Eyerdam; growing shells from mud bottom have sharp, deep grooved furrows, while some of the older fully grown shells with ridges ground off are easily mistaken for Saxidomus giganteus except for the crenulated margins of the inside of the shells.. this species lives apparently on the surface of the bottom below the lowest tide mark. (W.J. Eyerdam); dredged in shallow water off Monterey, Calif. 8/1940 (Burch).

Genus Compsomyax Stewart, 1930. Type (by original designation), Saxidomus gibbosus Gabb -- V. subdiaphana (Carpenter).

Dall placed subdiaphana in the genus Marcia and under Section Venerella Cossmann. Ralph B. Stewart, 1930, described Compsomyax as a new subgenus of Venerella Cossmann which he raised to generic standing there. Grant and Gale, 1931, accept Stewart's Compsomyax but place it as subgenus under the genus Clementia Gray, 1842. Dr. A. Myra Keen in her " Abridged Check List " again simplifies the matter by simply raising Stewart's Compsomyax to generic standing. The question seems to come to a question of whether or not that bifid right posterior cardinal is sufficient to establish a distinct genus.

Compsomyax subdiaphana Carpenter, 1864. " Sannakh Islands, Alaska to Santa Barbara Islands, Calif. and San Pedro " (Oldroyd) extended here to Todos Santos Bay, Lower California 7/4/38 (Burch). Type locality, Puget Sound.

Collecting data: Dredged in 10 fms. off Monterey, Calif. 8/37, off San Pedro, Calif. 5 to 25 fms., abundant off Redondo Beach in 1-25 fms. and off Ensenada, Lower Calif., Mexico in 20 to 50 fms. (Burch); Prince William Sound, Alaska, 18 fms. (Lewis); Craig, Ketchikan, Alaska in 10-20 fms. mud and off San Pedro, Calif. in 8 fms. mud (G. Willett); Drier Bay, Knight Island, Alaska, dreged in soft mud, 1923 and Victoria, B.C. and dredged off San Juan Islands, Puget Sound (W.J. Eyerdam); common in many southern California Pleistocene deposits.

Genus Protothaca Dall, 1902. Type (by original designation), Chama thaca Molina.

" Shell with the hinge of Paphia and of Venerupis s.s., but with a shorter, more ventricose shape, with more uniform concentric sculpture, and equally strong radial ribs."

Protothaca was described by Dall as a subgenus of Paphia Bolten, 1798.

Stewart, 1930 , followed by Grant and Gale, 1931 used Protothaca as a sub-genus of Venerupis.

Mr. George Willett comments " I think Protothaca is genus". Dr. A. Myra Keen in " Abridged Check List" uses Protothaca as a genus, and (Per. Comm. Nov. 1944) states " I still beat the drum for Protothaca. Paphia roding is a vastly different thing." Dr. Keen also kindly sent us an abstract of some of the work of Don L. Frizzell, Bivalves of the Genus Protothaca", (Abstract; Proc. Geol. Soc. America for 1934(1935), p. 387-388.

" The genotype of the genus Protothaca Dall 1902 (generally known as Tapes or Paphia) is Chama thaca Molina. The subgenus Callithaca Dall 1902 (type: Tapes tenerrima Carpenter) is tentatively considered a synonym of Protothaca, sensu stricto. The subgenera Rhomalea Jukes-Brown 1914 (type: Venus rufa Lamarck) and Tuangia Marwick (type: Venus crassacosta Deshayes) may prove desirable and are tentatively accepted. Twenty five fossil and Recent species are now known to belong to the genus Protothaca , all (with one possible exception in the Caribbean) are distributed around the Pacific Ocean. The genus is thought to have originated on the west side of South America in the Eocene. Species occur in the middle Miocene of the west coast of North America and in the Pliocene of Japan. One species lives in the Philippine Islands * and in New Zealand, also occuring in the Pleistocene of the latter locality. The conclusion seems justified that migration of the genus was northward along the coast of South and North America, by way of the Aleutian Islands of Japan, eventually reaching New Zealand. No evidence has been found to support the alternative theory of a south polar migration. Since the genus is essentially littoral, this migration implies land or island chain connections along the route during some of the time when migration took place" . * Note by M. Keen : " Frizzell later found that the Philippine Island record was in error, the result of a wrongly written label in one of the collections he had studied."

" Don Frizzell made an extensive study of Protothaca which was incorporated in his Doctoral thesis. He recognized as valid species only tenerimma, staminea, laciniata, and restorationensis from our section of the coast. Thus, ruderata, petitii, orbella, and spatiosa may all be regarded as ecologic forms, not as valid varieties."

Protothaca tenerrima (Carpenter),1856. " Vancouver, B.C. to Cape San Lucas, Lower Calif" (Keen " Abridged Check List" lat 23-49.

Dall placed this species in section Callithaca Dall, 1902. Grant and Gale, 1931 say of Callithaca " This subgenus is like the subgenus Humilaria in its shape and concentric sculpture, but it is like Protothaca in its pallial sinus and non-crenulated inner margins. It has a much more flattened shell and less conspicuous radial sculpture than Protothaca." However, our disposition is to abandon the use of Callithaca and consider all of our species as in Protothaca s.s.

This species is another of those puzzles described with a type locality Panama.

Collecting data: Tacoma, Wash. (G. Willett); fine living specimens in upper Morro Bay, San Luis Obispo Co., Calif. Jan. 1937, dredged off Redondo Beach, Calif. as deep as 25 fms., often washed in on the beaches from Sea Beach to Huntington Beach (Burch); Mud Bay, Thurston Co.,Port Madison, Kitsap Co., Friday Harbor, San Juan Id., Puget Sound (W.J. Eyerdam); this species probably occurs on many beaches of the Puget Sound region but seems to be quite uncommon. I have only found a few specimens and have never seen them in the local markets.(W.J. Eyerdam).

Protothaca restorationensis (Frizzell), 1930 Nautilus, Vol. 43, 1930, p. 120; Trans. San Diego Soc. Nat. Hist. Vol. VI, No. 21, pp 319-324, pl.22.

Puget Sound (Frizzell) to Half Moon, Bay, Calif. (M. Keen). Type locality, Recent, Little Beef Harbor, near Seabeck, Wash. Holotype from Upper Pleistocene of Restoration Point, near Blakely, Wash.

This species is said by Frizzell to be intermediate between Protothaca staminea and tenerrima. The original description follows: " Shell large and heavy, subquadrate, convex; surface sculptured by numerous rather fine but conspicuous radiating lines and a few raised , irregular, discontinuous concentric lines, the former markedly wider at both anterior and posterior ends, the latter high and most prominent on the anterior part of the shell; a very thin epidermis seems to have been present, although almost completely eroded on type; no lunule present; inner margins smooth; hinge long, rather narrow, greatly arched; three teeth in each valve, the posterior two in the right valve and the middle one in the left valve bifid; pallial sinus long, narrow and rounded. Length 96.7, height 74.3, thickness 45.3 mm."

Collecting data: Specimen which Frizzell identified as the species from Half Moon Bay (lat 38) (M. Keen); specimens taken from type locality in Jan. 1922 and 1931, Restoration Point, Bainbridge Island, Kitsap Co., Wash by W.J. Eyerdam Pleistocene- Recent living specimens seem to be quite rare (W.J. Eyerdam).

Protothaca staminea (Conrad), 1837. " Aleutian Islands south to Kamtchatka and northern Japan and to San Quintin Bay, Lower Calif. and Soccorro Island" (Grant and Gale, 1931). Dr. A. Myra Keen " Abridged Check List" gives lat. 23-73 which would take the northern range on up to the Arctic Ocean.

In regard to the subspecies ruderata, orbella and spatiosa while we will list them below with some discussion, it is our opinion that they are not good subspecies and should be abandoned to the synonymy of the typical. We shall omit them from our final list of species. Laciniata was listed by Dall as a subspecies of staminea but it is our opinion that it is a distinct species. See our note under petitii.

Protothaca staminea ruderata(Deshayes) 1853. " Southern Bering Sea to Lobitas, Calif." (Dall, 1921). " Status questionable" (G. Willett). Grant and Gale, 1931 say of this named variety " This variety is of considerable interest as it shows a transitional step toward Irus. However, the radial riblets , which tend to occur in pairs, have a Chione aspect. It is an inhabitant of holes in rocks". Walter J. Eyerdam reports taking it in soft shale at Port Orchard and Alki Pt., Seattle, Wash. but agrees with the consensus of opinion that it is merely an ecologic form and the name ruderata at best a mere convenience. We are abandoning this variety.

Protothaca staminea orbella (Carpenter), 1864. " Kodiak Island, Alaska to San Diego, Calif." (Dall, 1921). Again this form is the globular shape caused from confinement in pholad holes and is certainly not a true subspecies Eyerdam reports taking the form in many localities in Puget Sound.

Protothaca staminea spatiosa (Dall), 1916. " Puget Sound to Anaheim Bay, Calif." (Dall, 1921). As stated above this form is not distinctive and we propose to abandon the name. However, if it were of value we have taken specimens fitting the description exactly in many localities far to the south of the range given by Dall. This form is very abundant all the way south past San Diego.

Protothaca staminea petitii (Deshayes) 1839. " Aleutian Islands to San Quintin Bay, Lower Calif." (Dall, 1921). Type locality, Columbia River.

None of the members seem to be quite sure what this variety may be. Grant and Gale, 1931 say" It may be necessary to substitute the varietal name petitii Deshayes for laciniata ". Deshayes name is the older name. However, Frizzell abandons it to the synonymy of staminea. Mr. George Willett says

" Dont know how this wan be settled without seeing type or original illustration." However, subject to later correction we propose to abandon the name following Frizzell.

Protothaca laciniata Carpenter, 1864. " Unalaska, Alaska to San Diego, Calif. (Dall, 1921) extended to the Estero south of Ensenada, Mexico 10/1936(Burch). Type locality, Monterey or San Diego.

This reticulated form is easily distinguished and it is the opinion of the majority that it is a distinct species, It has strong ribs crossed by concentric ribs usually making it spinose.

Collecting data: While the published range seems to extend far to the north it seems that the collecting records are so largely from the south as to indicate that it is a southern species. Our experience has been to find it from Morro Bay, San Luis Obispo Co. south to Ensenada, Mexico. While not rare it is much less common than the abundant staminea. (Burch).

Protothaca grata (Say), 1831. This species was listed in Bulletin 112 by Dr. Dall because of a record from San Pedro by Williamson. However, it is the unanimous opinion of the members that any San Pedro record must have been based on some misidentification because grata is of the Gulf fauna. Typical of the opinions on this is Mr. George Willett's brief " Not Californian".

Genus Venerupis Lamarck, 1818. Type: Venus perforans Montagu (-- Venus pullastra Montagu) (by subsequent designation Children, 1823.)

" Shell of moderate size and thickness, ovate-quadrate in outline, sculptured with concentric lines or threads of variable strength and with strong or fine radial striations or ribs; hinge plate narrow, dentition like that of Paphia; pallial sinus of variable depth, ascending, rounded at apex" (Grant and Gale, 1931).

It is our opinion that Venerupis s.s. is not represented in our fauna.

Subgenus Ruditapes Chiamenti, 1900. Riv. Ital. Sci. Nat. vol.20, p.13. Type: Venus decussata Linnaeus (by monotypy).

" Shell of medium size, transversely broadly ovate, inflated, moderately stout, yellow or whitish, maculated with brown; umbones prominent, curved forward, halfway between the middle and the anterior end. The sculpture consists of radial ribs, strongest at the anterior and posterior ends, decussated by weaker concentric lirations. Ligament external, sunken and situated on a rather broad nymph. The hinge consists of three rather short, prominent slightly diverging cardinals in each valve; the two anterior cardinals in the left valve and the two posterior cardinals in the right valve are somewhat thicker and with a shallow cleft on top; no laterals. Interior white or pale salmon colored, sometimes tinged with purple. Ventral margin simple. Posterior muscle scar somewhat larger than anterior one; pallial line with a deep posterior sinus." Dall, Bartsch, Rehder (Molls. of Hawaii).

Venerupis (Ruditapes) philippinarum Adams and Reeve ,1850. Zoology Voy. H.M.S. Samarang, p. 79, pl. 32, fig. 10. This species indigineous to Japan has recently been introduced into Puget Sound with seed oysters from Japan and has bceome firmly established. The species seems to have been introduced into Hawaii also and is now established there.

In the discussions of this species the following opinion from Dr. A. Myra Keen is of interest (Per. Comm. Nov. 1944) " The name Ruditapes seems to be a synonym of Amygdala, which looks to me to be more closely related to Tapes than to Venerupis. However, this whole group of veneraceans is tough. Differences that to the layman are hardly noticeable seem to have a profound significance in the eyes of the specialist. Frizzell argued that that was because the superfamily represents the highest development of the pelecupods. Lack of crenulations on the interior margins and differences in lunule and escutcheon rule philippinarum out of Protothaca I believe"

Under the discussion of this species no doubt we should mention Paphia bifurcata. Quayle, 1938 (D.B. Quayle, Jour. Fisheries Research Board of Canada, vol. 4, no. 1.). In Nautilus, vol. 52, no. 4, 1939, pp. 139-40, Quayle synonymizes this with V. philippinarum,

Collecting data: Kitsap Co., Puget Sound, Wash. in 1943 and being sold in Seattle fish markets.(W.J. Eyerdam); also reported originally by Professor Trevor Kincaid ; Ladysmith Harbor (Quayle).

Genus Irus Oken, 1815. Type (by absolute tautonomy) Donax irus Linnaeus.

" Shell of small or medium size and thickness; sculptured with periodically elevated concentric lamellae, and on the early part of the shell fine radial striations; hinge similar to the hinges of Paphia and Venerupis except that the hinge plate is narrower and the teeth usually small and degenerate." (Grant and Gale, 1931).

Dall placed our species lamellifera under the genus Venerupis following a host of other authors before and since. A number of us find this group a little puzzling. The Chaces have a mount in their collection which they call their puzzle set in which you are invited to try to separate the Irus from the Protothaca. Grant and Gale recognize this close relationship with the following comment " This genus appears to be a specialized derivative of Venerupis, modified in characters by the burrowing habitof the animal. It lives in holes burrowed pholad fashion into soft mudstones, and like Petricola may take almost any shape according to the varrying hardness of the surrounding material. The variety rudorata of V. staminea is an indppendent adaptation of a related venerid to similar conditions and shows how close the relation is between Irus and Venerupis (Protothaca)."

However, Dr. A. Myra Keen gives the key to the distinction (Per. Comm. Nov. 1944) " Does Irus lamellifor show internal marginal crenulations ? If not, that alone would rule it out of Protothaca."

Irus lamellifer (Conrad), 1837. " Monterey to San Diego, Calif." (Dall,1921 Type locality, Monterey, Calif. San Diego ?

Collecting data: San Pedro, Calif. in 15-20 fms. (G. Willett); dredged in shale off Monterey in 10-20 fms., taken littoral from stones at Cauyocos, Calif. Jan/1938, Shell Beach below Pismo, Calif. (Burch).

Genus Liocyma Dall, 1870. Type (by original designation), Venus fluctuosa Gould.

" Shell trigonal or elongate-ovate, small, thin, smooth; furnished with concentric undulations and occasionally fine radiating lines; provided with a polished epidermis; pallial sinus small, rounded triangular; hinge teeth three in each valve, divaricate; middle tooth largest, grooved on the upper edge. Lunule faint, no areola ligament set in below the exterior surface." (Dall).

Liocyma beckii Dall, 1870. " Plover Bay to North Japan, on the east to Port Althorp, Alaska" (Dall,1921). Type locality, Plover Bay, East Siberia.

Liocyma scammoni Dall, 1871. " Port Simpson, British Columbia" (Dall).

Liocyma viridis Dall, 1871. " Arctic Sea southward to North Japan, and on the east to the Kodiak Islands, Alaska" (Dall,1921). Type locality,Arctic Ocean.

Collecting data: Punuk Id., Bering Sea in 15 fms., and Prince William Sound in 18 fms. (Lewis); Izhut Bay, Afognak Id., dredged in 10 fms. sandy bottom (W.J. Eyerdam, 1922); Hinchinbrook Island, dredged (I. Norberg) (Eyerdam).

Liocyma schefferi Bartsch and Rehder, 1939. Nautilus, vol. 52, no. 4, p. 111, April, 1939. Described from specimens taken in 10 fms. off Chuginadak Id. Aleutians. In Nautilus vol. 57, no. 4, p. 143, Walter J. Eyerdam extends the range 250 miles westward to Atka Id., Aleutians. Eyerdam also reports the species from Wislow, Unalaska Island on sandy bottom.

The authors state that this species is close to L. viridis " .. but the sculpture is weaker, the concentric ridges being fewer and more distantly separated.The shell is also broader and the umbones seem to be generally more centrally located." The figures in the Nautilus 52(4), Pl.8 are very clear and complete.

Genus Gemma Deshayes, 1853. Type, Venus gemma Totten.
" Shell rounded, subtriangular, subequilateral, smooth, margins crenulated within; hinge short and narrow; three teeth in the left valve, the middle one conical arcuated; two divergent teeth and an intermediate pit in the right valve; pallial impression marginal, with a narrow deep sinus."(Tryon)
Gemma gemma Totten, 1834. " San Juan Islands to San Francisco Bay. Introduced from the Atlantic with seed oysters. (San Diego ?)" (Dall, 1921).

Collecting data: This species is said to be established in San Francisco Bay. Mr. George Willett reports it from Oakland, Calif.

Genus Psephidia Dall, 1902. Type(by designation Dall, 1902), Psephis lordi (Baird).

" Shell small, veneriform, polished, with only concentric sculpture if any; beaks not prominent, valves inequilateral, with a narrow, feebly defined lunule and no escutcheon; surface feebly concentrically striate or smooth, with a polished periostracum; inner margins not crenate; pallial sinus angular , well defined; hinge with three delicate cardinal teeth in each valve, with no lateral teeth; dorsal margins outside the hinge plate, faintly grooved. " (Dall, 1903).
Psephidia lordi (Baird), 1863. " Unalaska, Alaska to Coronado Island" (Dall) Type locality, Esquimault Harbor, Vancouver Island, British Columbia.

Collecting data: S.E. Alaska, comm. 20-30 fms., and off Catalina Island in 30 fms. .. 1 specimen (G. Willett); off Friday Harbor, Wash. (T. Kincaid) Izhut.Bay, Afignak Id. and Drier Bay, Knight Island, Alaska and also the San Juan Islands (W.J. Eyerdam).
Psephidia ovalis Dall, 1902. " St. Paul Island, Bering Sea to San Diego, Calif." (Dall). Type locality, north side of Catalina Island, Calif.

Grant and Gale, 1931 make this a subspecies of lordi Baird. However, the consensus of opinion may be stated in one of Mr. George Willett's terse comments " Two species". The two seem to be easily separable. However, Mr. Willett also adds the following note " Would like to see northern records confirmed; have only found it in California".

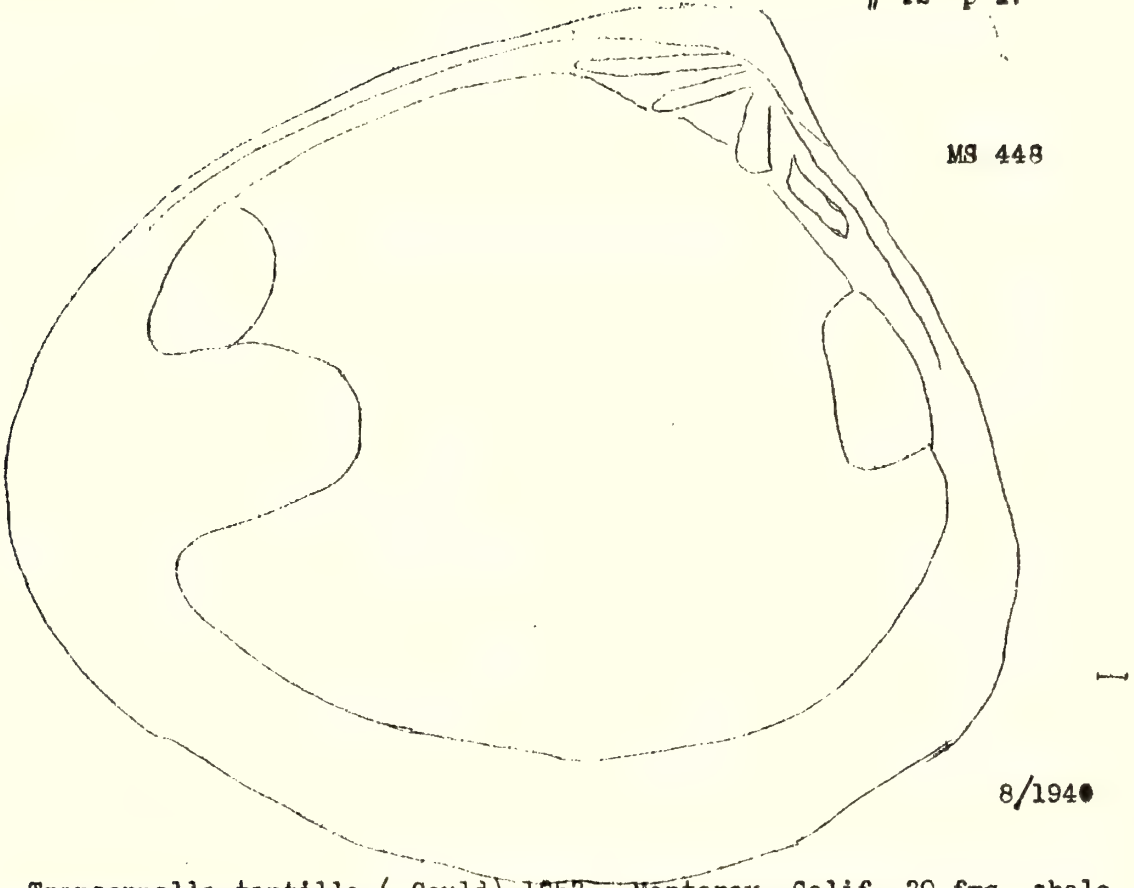
Collecting data: Dredged in great abundance off Redondo Beach and also off Catalina Island (Burch). Eyerdam reports from Hinchinbrook Id., Alaska .
Psephidia cymata Dall,1913. " Santa Barbara Islands to the Gulf of Calif." (Dall). Type locality, near Cerros Island, Lower California.

Collecting data: We have this species from the Pleistocene of Timm's Point, San Pedro, but have never recognized it in any of our Recent material. (Burch). And none of the members report taking it.
Psephidia brunnea Dall, 1916. " Monterey, Calif. to San Ipolito Point, Lower Calif." (Dall). Type locality, Catalina Island, Calif.

Collecting data: This species is easily separated from other material of the same size and we have dredged it consistently off Redondo Beach in from 25 to 50 fms. and also off Catalina Island. However, it has been comparatively rare in our experience in comparison with the exceedingly common ovalis.(Burch); Catalina Island in 30 fms. and off San Pedro in 20 fms. (G. Willett).
Psephidia salmonea(Carpenter), 1864. " Farralone Ids. to San Diego; also at San Martin Island, Lower Calif.(Baker) (Grant and Gale, 1931).

Collecting data: Dredged off Catalina Id. in 25 fms. (Burch).

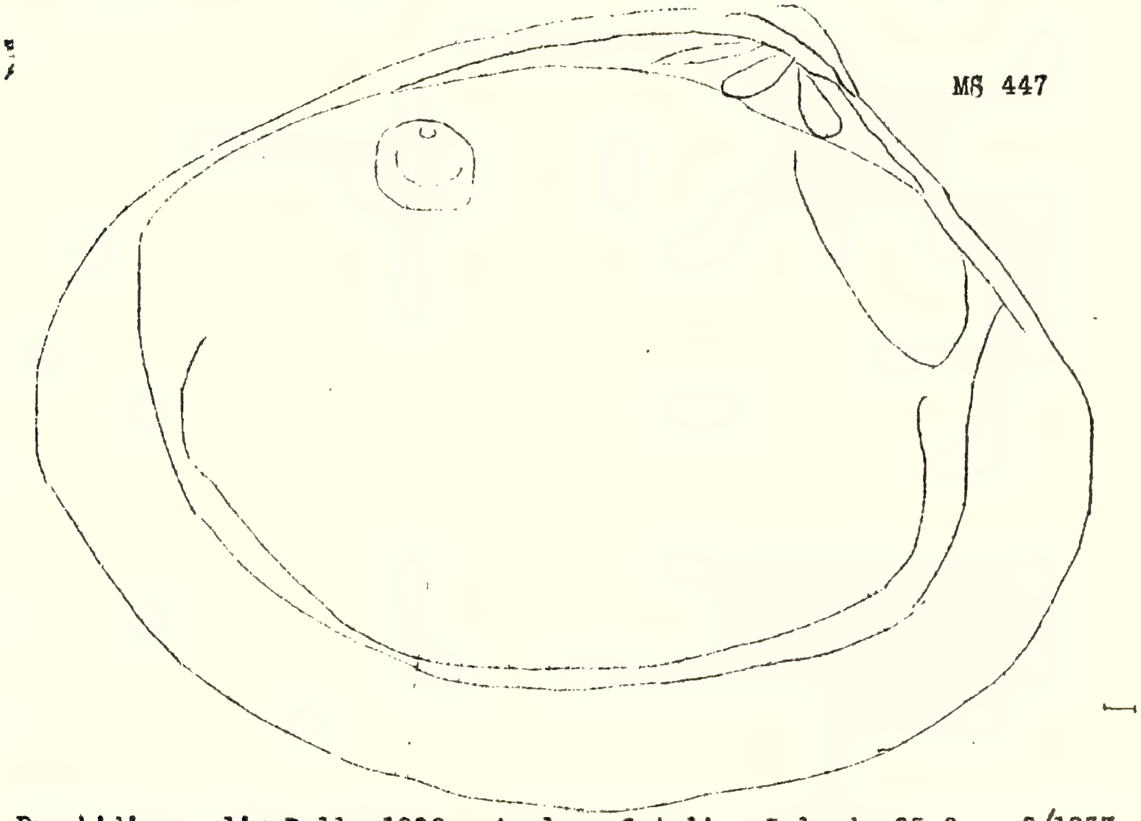
MS 448



8/1940

Transennella tantilla (Gould),1852. Monterey, Calif. 20 fms. shale

MS 447



Psephidia ovalis Dall, 1902. Avalon, Catalina Island, 25 fms. 8/1937

Note: When this specimen was opened (dried spec.) about a dozen small round shells as shown above were inside. I assume that this genus is viv-

-iparous and that these are its young. These small shells varied quite a bit in their size and development. Also from the date of collection it is obvious that this species " spawns" during August- at least off Catalina. T. Burch

Family PETRICOLIDAE

" Valves, when not distorted, equal, free, somewhat gaping behind, radiately sculptured with plain margins and inconspicuous umbos; posterior adductor scar larger than the anterior, pedal narrow, elongated, distinct; ligament and resilium external; area obscure or not defined; hinge without lateral laminae, with two or three small, usually bifid, radial cardinal teeth in each valve." (Cotton and Godfrey, 1938).

Genus Petricola Lamarck, 1801

There has been a diversity of opinions regarding the type of this genus. Dr. A. Myra Keen (Personal Communication, Nov. 1944) advises " The type of Petricola is P. costata Lam. -- Venus lapicida Gmelin, fixed by Fleuriau-Bellevue, 1802, and also designated by Schmidt, 1818. Naronia Gray is a synonym. Rupellaria Fleuriau-Bellevue, 1802, of which the type by subsequent designation of Dall, 1900, is Petricola lithophaga (Retzius), seems to be a valid subgenus of Petricola, not a synonym as stated by those authors who take lithophaga as type of Petricola. I believe none of our species fit in Petricola s.s. which has zigzag sculpture; carditoides, tellimyalis, and californiensis would go in subgenus Rupellaria; pholadiformis etc. in subgenus Petricolaria."

Subgenus Petricolaria Stoliczka, 1870. Type (by subsequent designation Tryon, 1884), Petricola pholadiformis Lamarck.

" Shell elongated, pholadiform, thin; hinge-teeth protracted, slender; pallial sinus deep."

Petricola (Petricolaria) pholadiformis Lamarck, 1818. Willapa Harbor, Pacific County, Wash. (Kincaid-Eyerdam), and San Francisco Bay, introduced with seed oysters from the Atlantic.

Collecting data: In our Minutes #26, p. 2, Aug. 1943, we reported this species from Washington in an article by Walter J. Eyerdam. Dr. G. Dallas Hanna " Exotic Mollusca in California", Bull. Dept. Agric. vol. 28, no.5, May, 1939, reports this species from Lake Merritt, Oakland and also the mud flats between South San Francisco and Burlingame. The Burches found it in great numbers on the mud flats along the Bay Shore highway just north of San Mateo, Calif., Jan. 1938. An additional note from W.J. Eyerdam states " Native to the Atlantic coast of America from Prince Edward Island to the West Indies and Texas, also introduced into Europe. Reported by Hans Schlesch in 1932 as living in England and France on Dover Strait and in Belgium and Denmark."

Subgenus Rupellaria Fleuriau-Bellevue ,1802. Type(by subsequent designation Dall, 1900), Petricola lithophaga (Retzius).

" Shell inflated and rounded in front, attenuated and more compressed behind; sculpture chiefly radial, stronger anteriorly." (Dall, 1900).

Petricola (Rupellaria) tellimyalis (Carpenter),1864. Described as Psephis tellimyalis, Rep. B.A. Rep. Moll. W.N. Am., 1864, p. 641. Range: Santa Monica, California to San Martin Island, Mexico.

The following references should be examined by those interested in this species which was thought by Dr. Dall to be the young of P. denticulata. Willett, G., Bull. So. Calif. Acad. Sci. vol. 30, pt.2, pp 39, figs. 1,2,3, 1931; Pilsbry & Lowe, Proc. Acad. Nat. Sci. Phila., vol. 84, p.97,1932.

Collecting data: Dredged off Santa Monica, Calif. in 7 fms., among Mytilus at Redondo Beach and also off Redondo as deep as 25 fms., in great

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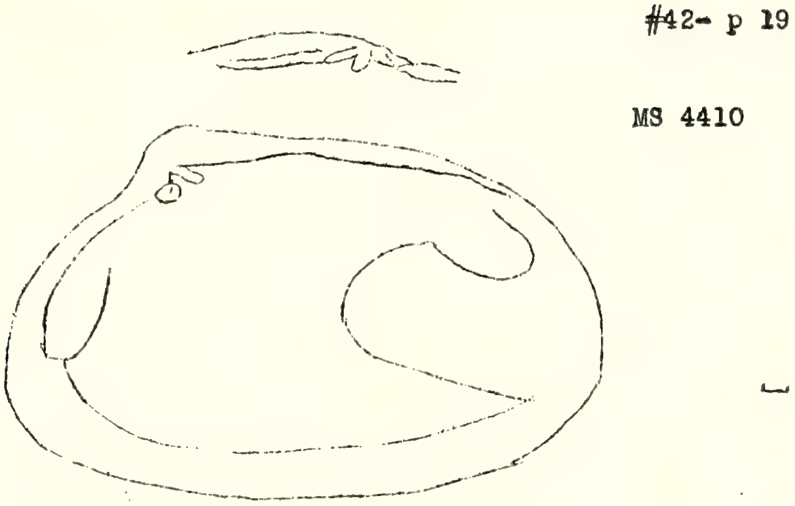
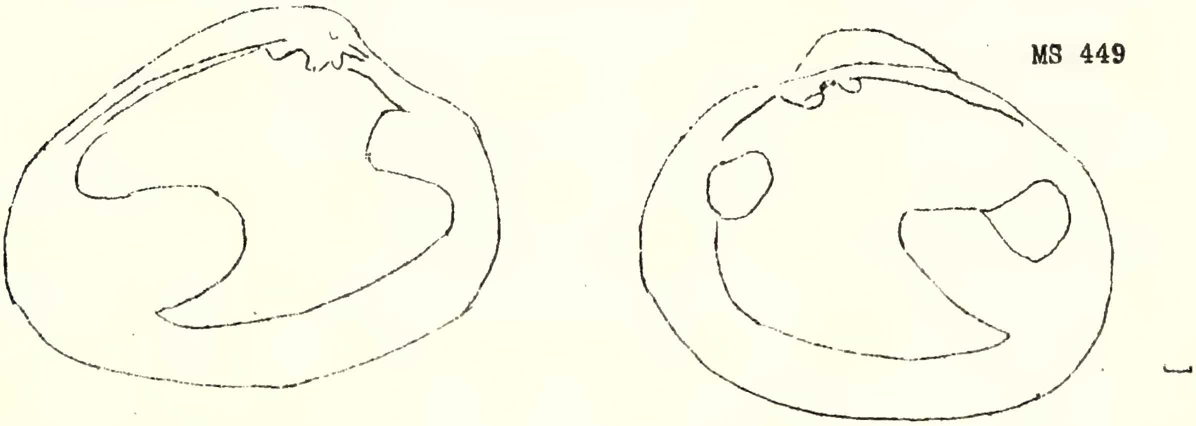


Petricola tellimyalis (Carp.), Malaga Cove, L.A. Co., Calif. on algae.
Nov. 1940.

MS 449



Petricola tellimyalis (Carpenter), San Martin Island, Lower Calif., Mexico
from the Dr. Fred Baker collection.

Note: As you can see the Malaga Cove shell is more elongate than the specimens from Lower California and the hinge, while showing a variation from Dr. Baker's specimens, is very nearly the same. It seems to me that many species have been described on smaller variations. T.A. Burch.

(con. fr page 18)
numbers on algae off Malaga Cove, Los Angeles county, Calif. and a set from Dr. Fred Baker labelled San Martin Island.

Sets of this species have been labelled almost everything in some of the local collections. It is not well known even though a comparatively common species.

Petricola (Rupellaria) carditoides Conrad, 1837. " Vancouver Island to Magdalena Bay, Lower California" (Dall). Type locality, near Santa Barbara.

Collecting data: Boring in shale at Crescent City, Calif., dredged in shale off Monterey in 20-40 fms., off Redondo Beach in 25 fms., littoral at Long Beach, Cauycos.(Burch); Alki Point, Seattle, Wash. and Restoration Point, Bainbridge Island, Kitsap Co., Wash. H. Rankin, 1933, Newport Oregon, clay rock, coll. by John Malone (W.J. Eyerdam).

Petricola (Rupellaria) californiensis Pilsbry and Lowe, 1932. Proc. Acad. Nat. Sci. of Philadelphia, vol. 84, pp. 96-97, 1932.

This has been the subject of extensive debate. It is safe to assume that at least 9 out of every 10 sets of this species in collections bear the label Petricola denticulata Sowerby, 1834.

Pilsbry and Lowe state that denticulata is confined to the Panamic province and that our shells are all californiensis. The range of californiensis is given " California and ocean coast of Lower California, San Pedro to San Ignacio Lagoon, the type from San Pedro.." A portion of their key follows;

Anterior end evenly rounded; pallial sinus broadly rounded at end; shell thin. California.
   Shell small, short, with weak sculpture, the height about 70-77 percent of the length ....P. tellimyalis
   Shell larger, about 26 mm. long, oblong, white, ribbed anteriorly ....P. californiensis
Anterior end tapering to a narrowly rounded point; pallial sinus tapering, long-triangular; shell more solid, partly purplish-brown. Panamic province ....P. denticulata

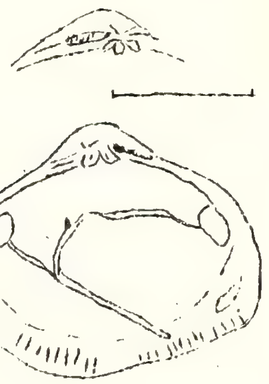
Note of opinion of John Q. Burch- The above distinctions between californiensis and denticulata has always been very unconvincing to me. It is quite possible that we have two species here, perhaps we have, but this species or several species seems to assume almost any shape. Those from Santa Monica and off Redondo Beach in the dredgings do seem to match the described characters of californiensis very well. However, those that come out of the shale at Playa del Rey and also those from Anaheim Landing with the pholads seem to me to be just about perfect examples of denticulata by the discussion of Pilsbryand Lowe. They have the purplish brown color, the anterior end tapers to a narrowly rounded point, the pallial sinus is long-triangular etc. Sets from San Onofre, Santa Monica,Newport Bay, Redondo Beach etc. show the anterior end rounded and even show a surprising difference in the pallial sinus as described for californiensis. However, it is my personal opinion that this is but one species showing these variations caused by the material in which they live.

Family COOPERELLIDAE

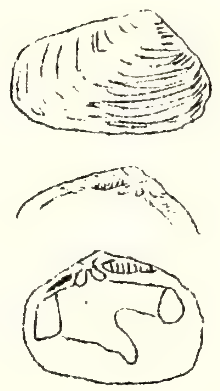
Genus Cooperella Carpenter,,1864. Type, Oedalia subdiaphana Carpenter, 1864. " Hinge plate narrow, carrying two right and three left subumbonal divaricating short cardinal teeth, of which the left central tooth is always, and the others frequently bifid; laterals none; muscular impressions small,oval; pallial line narrow with an ample sinus.." (Dall, 1900).

Cooperella subdiaphana (Carpenter),1864. " Queen Charlotte Islands to Gulf of California" (Dall). Type locality, San Diego, Calif.

Collecting data: Santa Monica, 10 fms. (G. Willett); Alamitos Bay, Mission Bay, Estero south of Ensenada, Mexico. Dredged off Redondo Beach, Calif. in as deep as 25 fathoms. (Burch).



Cooperella



Petricola

Professor Herman W. Miller, Academia Adventista Hispano Americana, Apartado 1320, San Jose, Costa Rica. " .... I have no news yet. I have been doing some work for the National Museum here-- getting their nomenclature up to date. It was in bad shape but they don't have anything that will bother me much except the land shells. I am getting to see some specimens that way that I had'nt seen before. School will soon be out down here and I have plans for a trip or two. Hope to get something of interest for those of you who so generously contributed to our collection. Give my regards to freind Chace and tell him I have the rest of his stamps and as soon as school is out and I have a chance to write some letters I will send them. I hope some of you have been too busy to spend your money for the last few months and that when you lose your present jobs you will come to Costa Rica to spend part of it. There are some places down here that are worth the effort it costs to get to them. I know ehere some of themare and if all goes well I will soon knowwhere some more are. I intend to make a definite effort next year to reach the place that is or was called Puerto Portrero. I don't think I can make it this year. I also want to visit Port Parker, and Golfo Dulce is on the list. "

We are looking forward with interest to a report from our friend and fellow member Miller giving us a faunal list of what he finds in these places of interest.

Pvt. James P. Conlin, A.S.N. 38627568, Enlisted Detachment Branch, 3610 Service Unit, Percy Jones General and Convalescent Hospital, Battle Creek, Mich. " My wife has been forwarding your Minutes and I enjoy them very much. Since being assigned here I have been trying to build up my collection of mollusks, but being separated from all literature and libraries makes it very difficult. There are a number of questions I would like to ask."

Editors note- thinking these questions might be of interest to others they will be answered as asked.

Is Julia E. Rogers " Shell Book" still in print and if so who is the publisher ? A- Yes- Miss Rogers book is in print and sells for $6. Suggest that you write Miss Rogers personally and get anautographed copy. Her present address is 355 Junipero, Long Beqch 4, Calif.

As wellas I remember there was a book by Walter Webb on " Shells of the World. Is this available ? A- We had a recent letter from Mr. Webb to the effect that his book is out of print at this time but he is now in the process of publishing a bigger and better edition.

Do you know the address of the Bahamas Conchologioal Society ? A- The president of this society is in the United States at this time at least for this winter and it is suggested that you write to Rev. Paul D. Ford, 160 W. 20th St., Erie, Pa.

Are there other dealers in foreign shells than the Hadleys, Frank Lyman and Wards ? A- Suggest that you write Ted Dranga,4340 S.W. 14th St.,Miami 34, Florida and Walter F. Webb, 202 Westminster Road, Rochester, N.Y. There seems to be a host of small dealers largely selling curio shells. We need a few. Most of our west coast stores are likely to display the showier species with usually perfectly absurd locality labels. The latest I noticed was a very fair Epitonium pretiosum said to have been collected at Laguna Beach, Calif .

Is there a dealer in Australia ? I am very interested in the genera; Chama,Spondylus,Avicula,Pinctada,Meleagrina,Tenagodus,Trigonia etc. from the Australian region and would appreciate any ones name that I might contact in regard to them. A- I have never known of a dealer in Australia. However, this edition of these Minutes will go into the hands of some 40 to 50 active Australian collectors. Perhaps one or more will notice the query. I suggest though that no doubt Mrs. Fulton could supply all of these. She is the widow of the late H.C. Fulton and is carrying on his shell business - address Mrs. Fulton, 2 Florence Road, London, W. 5, England.

E.P. Baker,417 Downey Ave., Downey, Calif. Ned has just informed me that he is sending Jack Brookshire a copy of Hirase Japanese Shells. We are glad.

The December Bulletin of the Natural History Museum of San Diego has beenreceived. The many activities of this fine institution never fails to impress me. The many fine lectures and meetings announced are alone enough to make anyone wish he lived nearer San Diego. I am personally not much of an addict to long hikes preferring a horse at least. However, I note that the San Diegans skedule six different hikes forthe month of December alone, each hike under the leadership of some specialist on some branch of natural history. As little as I care about walking I feel quite sure that I would go along if it were possible.

Harold W. Harry, Ph./M 1/c (our member Harry is obviously in the Navy and his address had better be his home, Rt.2, Box 222, Shreveport, Louisiana) " Recently I have collected at two very interesting places, but both were beach combing parties at moderate tide. The land fauna has been the most successful. I collected a big Achatina at (blank), a very famous place, which has provided hours of dissection; and recently I got a few Ellobiidae and a Truncatella alive- one was a Melampus (all Melampus look alike- dont they) and one was a shell I had gotten from you one sunday when I rummaged through your duplicates- Small world, huh? But the gaudy things, Cypraea,Conus,Murex, and the like do not seem as plentiful on the beaches as they do in American collections; Oh, a few, a C. caput-serpentis and C. annulata, and fragments of others, but my collecting has been a matter of 2 or 3 hours in each place, in strict military formation and with some competition for cats-eyes, which I gladly gave all who wanted them. I am not sorry that my collection is small that the species are inconspicuous- Nassa, Natica, and dock shells etc., for the few that I collected alive have given many hours of dissection. I have rationalized that it is perhaps better to do a little,more intensively,than a lot hurriedly. The big job is getting them back. Without labels the stuff is worthless,and the labels are censorable. So I save them for a day when we return tothe states or to some place where they may be sent. Tell everyone Hello; I have not yet run into Wright; Glen Webb is in France. Recently I had a letter from Tomlin (St. Leonards-on-Sea, England) in which he mentions recent correspondence with you. Small world- huh? But thats not considering the Pacific. Godfrey/ is it big/ "

Dr. John Oughton, Royal Ontario Museum of Zoology, Queens Park at Bloor Street, Toronto, Ontario, Canada. " Many thanks for the Minutes. They continue to be very interesting. You are doing a good job in providing a meeting point for all with an interest in shells.

I spent the summer doing fishery research on Great Slave Lake. We went by train as far as Waterways in northern Alberta. Then by slow river boats down the winding muddy Athabasca and Slave Rivers- the same route used for the Canal Project supplies. We travelled widely about the lake in the course of our work. Gill-netting,bottom dredging,sounding, and physico chemical determinationsmade up most of our program. On our longer trips we had time between samples to play cribbage and hearts. During the early part of the season we had almost continuous daylight. In fact, the sky wasn't dark enough to show up stars at first. I didn't notice them until early August/. I managed to bag several samples of fresh water shells but have not sorted them out yet.

The Hon. Chief Justice F.R. Latchford, carried on a study of shells and a wide correspondence with American conchologists throughout his long life. He died a few years ago and his collection is now in the possession of this museum."

J.M. Gregh, 59 Bihind St.,Ubaldesca Str.,Casal Paula, Malta. We are happy to have a nice Christmas letter from our friend and to know that he and his are well. One sad duty to perform is to notify him that I will be unable to deliver his Christmas card to our mutual friend John Clarke. Mr. Clarke passed away very suddenly a few months ago. We announced it with an outline of his life in these minutes.

MOLLUSCAN ANATOMY

by Thomas A. Burch

Instead of merely describing the anatomy and morphology of mollusks, I shall discuss their anatomy as it bears on their classification. Instead of describing the structure and functions of the various organs, glands etc., in the molluscan body, it will be my aim principally to show the distinction and similarities between the various classes, orders, suborders, and superfamilies of Pelecypoda and Gasteropoda.

Before I begin, however, I believe it would be best to say something about the development of a mollusk. The early development of all mollusks, except the Cephalopods, is fundamentally the same. Thus the following description could apply to any of the other classes with but a few modifications. All mollusks pass through a free-swimming stage-- the trochosphere, which is similar to a corresponding stage in Annelidan and Arthropodan development. The trochosphere stage is characterized by a top-shaped body with cilia confined to the blunt anterior end and the foot, and by the appearance of a shell gland opposite the mouth (fig.1.). In the twenty four hours after becoming a trochosphere, a shell is secreted by the shell gland, a velum of cilia is formed for swimming and food getting, and the foot becomes larger. This second free-swimming larva is called the veliger (fig.2.). The change from trochosphere to veliger is accompanied by very little increase in size; but at the end of the veliger period, which is usually from 6 to 12 days (depending upon the temperature of the water), important changes occur and the adult form is assumed very rapidly. The animal increases in size. The velum dissapears, and the foot loses its swimming function, the shell becomes bivalved in Pelecypoda- (fig.3) and coiled in Gastropods. The young embryo then leaves its free-swimming life and sinks to the bottom.

From here on the development of the various classes and orders differs . In most pelecypods a gland in the foot secretes a byssus by which the animal attaches itself. During this attached life the various organs of the body slowly take on adult characteristics. So small is any one individual's chance of surviving the various unfavorable conditions and the many enemies surrounding it that it has been estimated that about one in 20,000 of the tiny embryos reaches maturity.

While we do not know exactly what the ancestral mollusk looked like, it is possible to make a guess at their structure (fig.4.). They possessed the usual molluscan characters, they had a head with tentacles, a flat creeping foot, a conical visceral hump covered by a mantle, which possibly contained numerous calcareous spicules and not a complete shell. The mantle cavity was posterior and contained the gills, anus, and common apertures of the kidneys and gonads. The alimentary canal contained a radula in a muscular buccal mass. (Borradaile & Potts). The heart had a median ventricle and a pair of auricles. In the nervous system there were as in annelids and arthropods, a circumoesophageal commissure or " brain" which may or may not have been ganglionated. Ventral pedal cords, a visceral commissure coming from the pleural part of the brain, and a pallial commissure in the mantle edge were also present. From this beginning diverged the different groups which we know today.

The chitons (Amphineura) (fig.5) which departed least from the ancestral structure became elongated but limpet-like forms, their mantle cavity extended all around the foot while instead of a single pair of gills many such pairs arose.

The Gasteropoda (fig.6) remained as short creeping forms; they are characterized by the growth of the visceral hump dorsally, but unequally so that it has coiled in a spiral, which is covered by a single shell. This caused readjustment of the visceral hump which has revolved (usually to the right) on the rest of the body through 180 making the mantle cavity anterior. This process is called torsion and is characteristic of all gastropods.

In development from the larva the mantle cavity first appears behind the visceral hump (fig. 8a & 9a) and at a particular stage rotates in a counterclockwise direction through and angle of 180 on the rest of the body. (figs. 8a & 9a). Only the narrow neck of tissue and the organs which pass through it, between the visceral hump and the rest of the body, are actually twisted, but the orientation of the mantle cavity and its organs is changed. Before torsion the gills and anus point backwards, (figs. 8a & 9a) and the auricles are in front of the ventricles. After torsion the gills and anus project forward, (figs. 8d & 9c) and the auricles are in back of the ventricle The uncoiled visceral nerve loops have been caught in the twisting and one laid over the other, one over and one under the intestine, both coming together near the anus forming a figure eight. This whole process takes only a few minutes for completion.

The large majority of gastropods belong to the order which exhibits torsion in full development, called Streptoneura or Prosobranchiata (see table I). The order may be divided into two groups, a primitive one, Aspidobranchiata or Diotocardia in which two gills and thus two auricles are preserved, and a more specialized one, Pectinibranchiata or Monotocardia in which the right (primitive left) gill, its auricles and even kidney have dissapeared. Some of the Aspidobranchiata like Trochus are in an intermediate stage.

It is possible that the dissapearance of the organs of one side is to be regarded as a consequence of processes concerned in torsion and that in Aspidobranchiata the phenomenon cannot be regarded as having reached its climax. On the other hand the Opisthobranchiata show that the changes occuring in torsion are to a certain extent reversible. They have the gill pointing, backwards (as in fig. 9a), the auricle behind the ventricle and the visceral loop untwisted and symmetrical. There are some forms (Bullomorpha, Acteon) in Opisthobranchiata which possess a complete coiled shell but show only 90 of torsion (fig. 10 & 11), so that the anus and gill point laterally instead of anteriorly. The visceral nerve loop also shows untwisting and the forms of this division are thus supposed to show partial reversion of torsion or detorsion. Forms like this pass into the typical Opisthobranchs with complete detorsion,(Tethys) in which the shell is reduced or lost, the gills directed posteriorly and the visceral nerve loop is completely untwisted (as in fig 9a)

The Pulmonata are usually united with Opisthobranchiata to form the subclass Euthyneura, as does Dall in Bull. 112. But " Euthyneury" or symmetry of the nervous system (more particularly the visceral part of it) is arrived at in different ways in the two divisions. In the Opisthobranchiata it is by, detorsion. In Pulmonata the shell is retained and the visceral hump coiled in typical members of the group, but the visceral nerve loop is shortened and untwisted at the same time and is incorporated with its ganglia into the circumoesophageal nerve collar, so the nervous system becomes symmetrical (figs. 12 & 13). The most primitive members of the Pulmonata still show a twisted visceral nerve loop which is beginning to shorten (fig.12). All of the group have lost the gill but they retain the single auricle which shows them to be derived from the Pectinibranchiata.

One of the most characteristic structures of all mollusks, with the exception of the Pelecypoda, is the possession of a radula, which is a thin membraneous ribbon bearing transverse rows of many tiny chitinous teeth. The radula is usually borne on a cartilagihous support, the odontophore, furnished with protractor and retractor muscles by whose action the radula may be sent out through the mouth and work to and fro like a rasp upon the animal's prey (fig. 14). It is also used as a tool for boring into other shells in order to extract their contents. Only a small portion of the radula is used at one time.

The radula becomes modified differently according to the use to which it is put. Thus the radula of a carniverous snail, like Murex,(fig. 22a) is different from that of a herbiverous snail, like Tegula (fig. 17). All modification in the teeth proceeds from the median line of the radula outwards toward the edge, the outer marginal teeth being the last to be modified. Thus a study of the marginal teeth often gives a clue in many cases to the ancestral condition of a much modified radula; although in many groups the change has been so long established and has proceeded so far that even the outermost teeth no longer retain their primitive form.

The medial or Rachidian tooth of the radula is the central one (fig. 17) The lateral or Amedian teeth lie between the other two sets and a re less numerous but usually larger and more variable. The marginal teeth or Uncini near the margin are s mall, simple, and very much alike. The radula is bilaterally summetrical. Any series of teeth may be absent or repeated.

The structure of the radulae are used in the classification of all mollusks which possess them. The superfamilies of the Streptoneura or Prosobranchia are usually based upon the structure of the radula. Suborder Aspidobranchia

Docoglossa; Radula with a few strong teeth. The number in a row range from two to twelve. The ribbon is often very long, the teeth heavy. This includes Acmaeidae,Patellidae, and Lepetidae (fig. 16).

Rhipidoglossa; The radula is remarkable in the development of the uncini or outer teeth. They are long, hooked, often cusped, arranged like a fan's ribs, curving backwards as they diminish in size. In only a few cases are they countable. This includes about seventeen families among which are Turbinidae, Trochidae,Phasianellidae, Haliotidae, and Fissurellidae. Dall included the last two in a separate superfamily, Zygobranchia, but other authors place them here (figs. 17 & 18).

Pectinibranchiata

Gymnoglossa; Both jaw and radula are absent. This includes the Mellanellidae and Pyramidellidae.

Ptenoglossa; The radula possesses an indefinite number of hooked teeth, the outside being the largest. In Janthina the central tooth is absent, the ribbon being of two large divisions with a gap between them down the center. This includes Janthinidae and Epitonidae (fig. 19).

Taenoglossa; The central tooth is very variable, usually multicuspid, the central cusp being dominant; a single lateral, more or less cusped; two uncini, simply hooked or a little cusped. This superfamily contains about 46 families including Cypraeidae, Bursidae,Cerithidae, Littorinidae,Crepidulidae,Naticidae (fig. 20).

Dactyloglossa; Ovulidae and Pediculariidae (fig. 21).

Rhachiglossa; Most all are carniverous. The radula consists of a central tooth with one to 14 cusps, and a single lateral with more or less cusps. The teeth are mostly sharp, hooked, and with a broad cutting edge. This includes Olividae,Mitridae,Fasciolaridae, Neptuneidae,Nassidae,Muricidae, and Coraliophilidae, The later does not have a radula (fig. 22).

Toxoglossa; The radula consists merely of large marginal teeth on each side, no central tooth and no laterals. This includes Terebridae,Conidae, and Cancellariidae. (fig. 23).

See figs. 24-27 for radulae of other orders of Gasteropods.

The details of the reproductive system are of great importance in the classification of the other orders of Gasteropods and also the Scaphopods and Amphineura.

The sexes are separate in most Streptoneura but are united in Opisthobranchiata and Pulmonata. ' fig. 29). In dioecious forms the reproductive apparatus is simple, consisting of an ovary or testis situated dorsally in the visceral spiral with gonoducts forward on the right hand side of the rectum. In the male there is a non-retractable penis (fig. 29a). Hermaphroditic forms, such as Helix (fig. 29c) and Navanax (fig. 29b) have a complex apparatus consisting of an ovatestis or ' hermaphrodite gland', convoluted 'hermaphrodite duct', 'an albumen gland, sometimes a separate oviduct and sperm duct and sometimes a single duct. Usually a retractable penis.

The Pelecypoda or Lamellibranchiata are flattened from side to side, the whole body being covered by two mantle lobes secreting two shell valves united by a median hinge. The gills inside the greatly enlarged mantle cavity have developed into huge organs of automatic food collection and so the head thus rendered unnecessary and withdrawn into the mantle cavity has become vestigal. Similarly the foot has lost its flat sole and has to be extended between the valves to move the animal.

The facts that the pelecypod shell, at its first appearance is univalve and the foot of the most primitive forms is of the creeping type and their gills plume-like, suggest that the class was derived from a form resembling a simple type of gasteropod with bilateral symmetry, paired gills, kidneys and auricles; and the fact that those organs are also paired in the lower gasteropods seems to point to a common ancestor for Pelecypoda, Amphineura, and Gasteropoda.

The organs of respiration are the gills and mantle. The gills are two in number-- right and left-- each consisting of a horizontal axis bearing two rows of filaments-- an outer and an inner.(fig.30). The British usually arrange the Pelecypoda according to their structure of their gills. There are three groups which can be arranged in an evolutionary series showing the gills becoming larger, more complex and solid forms. Lastly there is an isolated group, Septibranchia, in which the habit of life has completely changed and the gills have practically dissapeared. Protobranchia-- Nucula, Solemya-- filaments short, compressed and free from one another; Filibranchia-- Arca, Pecten, & Mytilus -- filaments delicate and somewhat flattened threads, each bends upon itself in a "V"; Eulamellibranchia-- Ostrea, Cardium, Mya, Anodonta-- gill filaments united by vascular interfilaments resulting in firm basket-like gills; Septibranchia- gills reduced to horizontal muscular partitions. This includes Poromya, Cuspidaria etc.

The systemetists of this country, including both Dall and Johnson, have arranged the pelecypods according to their hinge structure. It is interesting to note, however, that the two systems correspond fairly well if the Protobranchia and Filibranchia of the British are lumped (see table II).

The peculiarity of the digestive system of Pelecypoda is the presence of a diverticulum of the intestine, the cells of which secrete a Crystalline Style. This structure projects into the stomach against a structure called the gastric shield. It is constantly worn away and the style material is mixed with the contents of the stomach. There is no doubt that this represents a special provision for the digestion of carbyhydrates. It is also found in some gasteropods. No portion of the digestive tract of Pelecypods is used in classification as in the gasteropods.

The nervous system of molluscs in general is fundamentally the same, each class and order merely having modifications of typical arrangement. The more primitive pelecypods have four distinct pairs of ganglia,(fig.7) but in the remainder of the class the number is reduced to three by the fusion of cerebral and pleural ganglia.

The reproductive system of the Pelecypoda is likewise of little importance in classification.

In the Cephalopods the primitive bilateral symmetry is retained; though there is an unequal growth of the visceral hump relative to the rest of the body, as in gasteropods, however, it is coiled in a plane spiral. There is no torsion, the mantle cavity remaining posterior. The primitive forms in the group have an external shell which is divided into chambers, those behind the body chamber containing gas. This has had a great effect on the development of the group, for by diminishing the specific gravity of the animals it has enabled them to become more or less free swimming. They have tended with the loss of the shell to become more and more efficient swimmers, and this is associated with the development of their preditory habits.

The most characteristic special feature of the group is the extraordinary modification of the foot into arms or tentacles and the funnel. The class is raised far above the remaining Mollusca by its wonderfully high organization, especially of the nervous systemand the eye. There is nothing to indicate close relationship with any of the lower classes beyond the general conformity to the molluscan plan of organization and the presence of a radula (fig.28). The Cephalopod form is, in fact, a singularly isolated group. Paleontology has not hitherto given any indication of their origin; and embryology is equal--ly silent; the absence of free swimming larva and the profound modification in development produced by the enormous mass of egg yolk, sharply separates them from all other members of the phylum.

Table I. Classification of Gasteropoda

- Prosobranchiata or Streptoneura
  - Aspidobranchia (Diotocardia)
    - Docoglossa
    - Rhipidoglossa
    - (Zygobranchia)
  - Pectinibranchia (Monotocardia)
    - Gymnoglossa
    - Ptenoglossa
    - Taenioglossa
    - Dactyloglossa
    - Rhachiglossa
    - Toxoglossa
- Opisthobranchiata
  - Tectibranchia
  - Nudibranchia
  - Pteropoda
- Pulmonata

Table II Classification of Pelecypoda

American	British
Prionodesmacia	Protobranchiata
Nuculacea	Nucula
	Filibranchiata
Arcacea	Arca
Pectinacea	Pecten
Mytilacea	Mytilus
Ostracea	
Teleodesmacea	Eulamellibranchiata
	Ostraea
Cardacea	Cardium
Veneracea	Mya
Mactracea	Anodonta
Myacea	
Anomalodesmacea	Septibranchiata
Poromyacea	Poromya
	Cuspidaria

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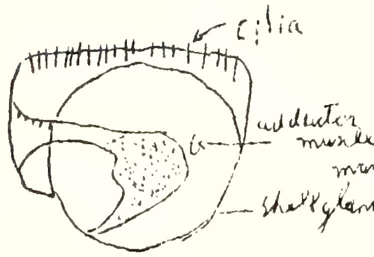
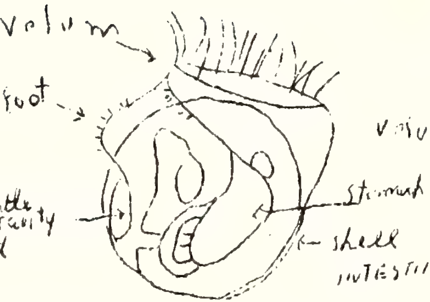
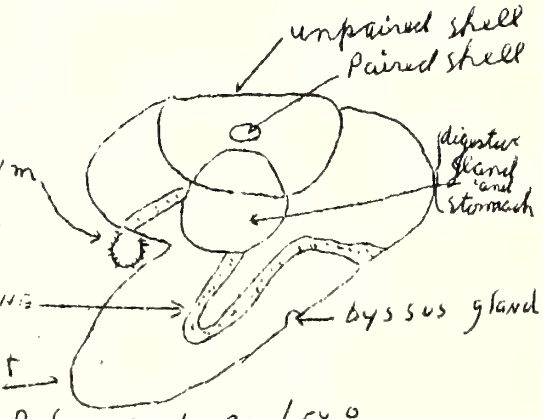
Shimer- An Introduction to the Study of Fossils
Tryon- Structural and Systematic Conchology
Dall- Mollusks of N.W. Coast of America- Bull. 112
Johnson- Marine Mollusca of Atlantic Coast.


cilia
adductor muscle
shell gland

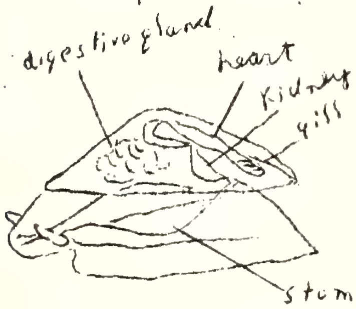
1. Trochosphere (adapt. P&H)


velum
foot
mantle cavity
stomach
shell

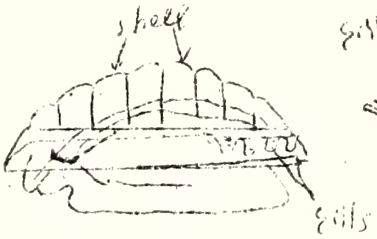
2. Veliger larva (B&P)


unpaired shell
Paired shell
velum
digestive gland and stomach
INTESTINE
byssus gland
foot

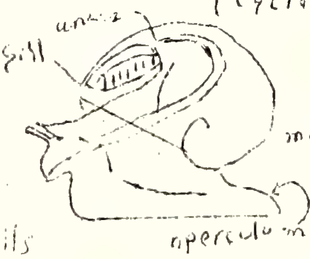
3. Pelecypod embryo (Cyclas P&H)


digestive gland
heart
kidney
gill
stomach

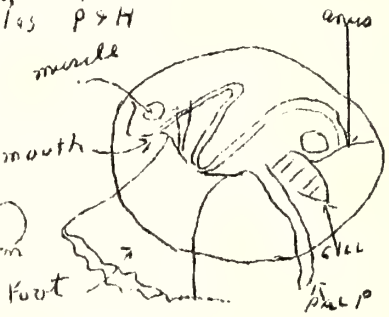
4. "ancestral mollusc (B&P)


shell
gills

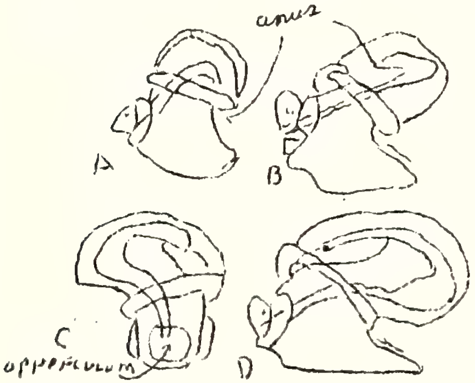
5. Amphineura (B&P)


gill
anus
operculum

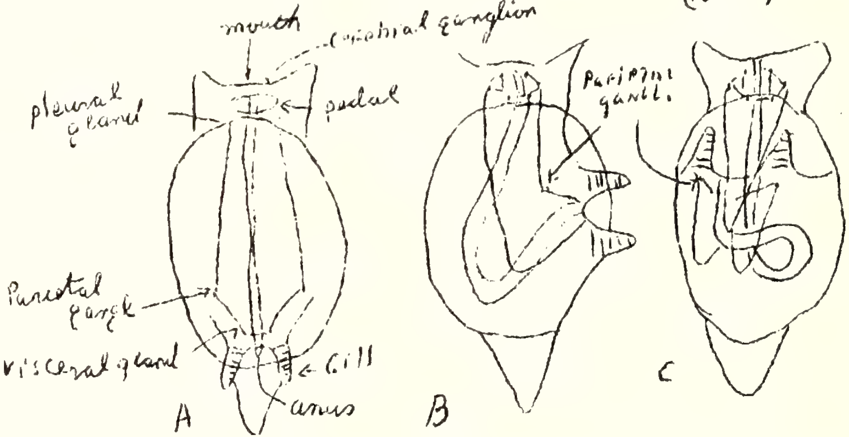
6 Gastropod (B&P)


anus
muscle
mouth
foot
gill
palp

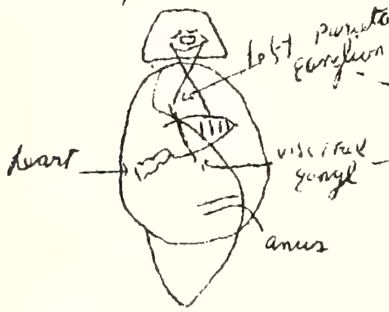
7. Pelecypod (mussel) (B&P)


anus
A
B
C
operculum
D

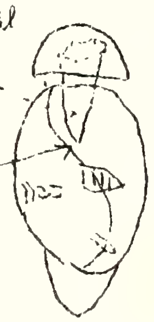
8 Torsion in Gastropoda (Paludina - B&P)
A Symmetrical embryo
B - C - 90° D adult
ABD left side C behind


mouth
cerebral ganglion
pleural gland
pedal
Parietal gangl.
Parietal gangl
visceral gland
Gill
anus
A
B
C

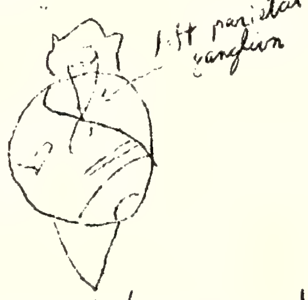
9. Torsion in Gastropoda - from above (adapted fr B&P, P H)


left parietal ganglion
heart
visceral gangl
anus

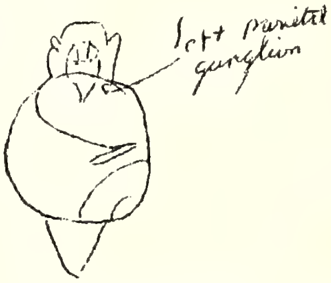
10. Acteon



11 Bulla


left parietal ganglion

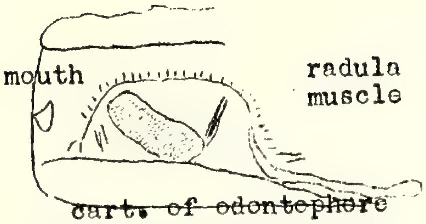
12. Chilina


left parietal ganglion

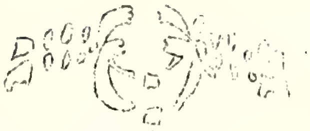
13. Typical PULMONATA

To illustrate the origin of euthneury in Opisthobranchiata- 10,11 (by detorsion) and in Pulmonata- 12,13 (by shortening of nerve connectives)

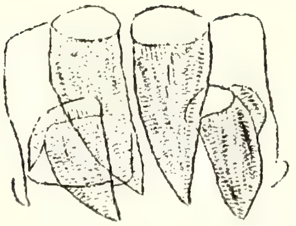
RADULAS


mouth
radula
muscle
cart. of odontophore

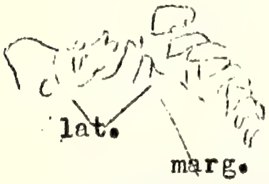
f.14. Diagramatic sec.
thru mouth of Triton
(P. & H. , B. & P.)



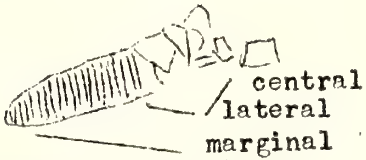
f.15. Amphineura
Cryptochiton
(Tryon)



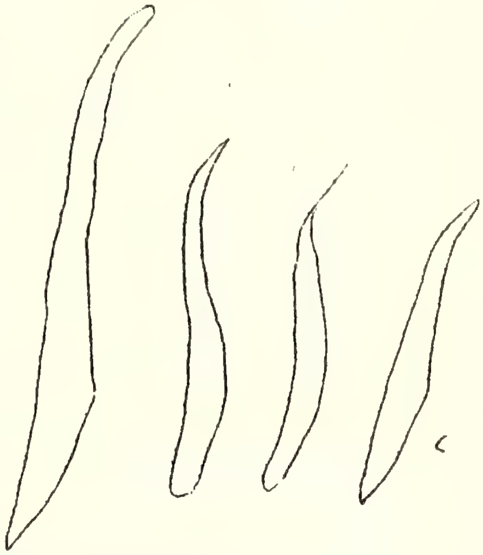
f.16. Docoglossa
Lottia gigantea (T.B.)



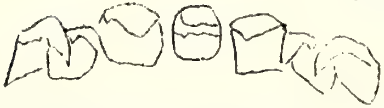
f.17 Rhipidoglossa
Phasianella pulla
(Tryon)


central
lateral
marginal

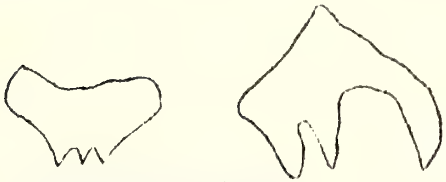
f.18. Zygobranchiata
Haliotis (B. & P.)



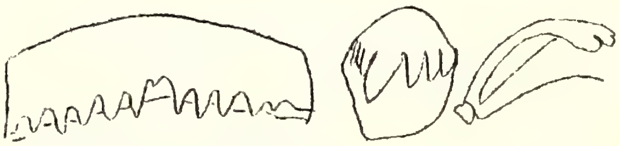
f.19. Ptenoglossa
Janthina exigua (T.B.)



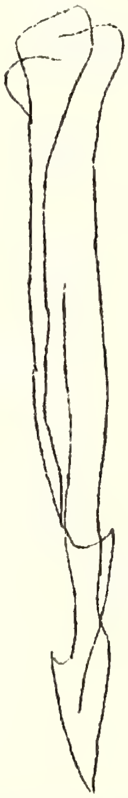
f.20. Taenioglossa
Cypraea exanthema (Tryon)

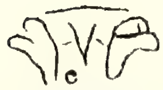


f.22. Rhachiglossa
Kellèttia kellettii (T.B.)

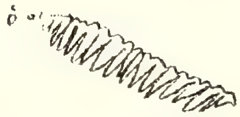


f.24. Tectibranchiata
Bulla gouldiana (T.B.)



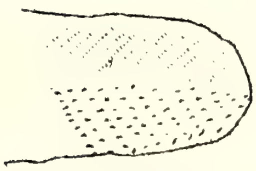


f.26. Pteropoda
Hyalea tridentata (Tryon)

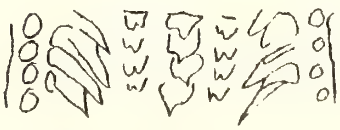


f.25. Nudibranchiata
Doris obvelata (Tryon)

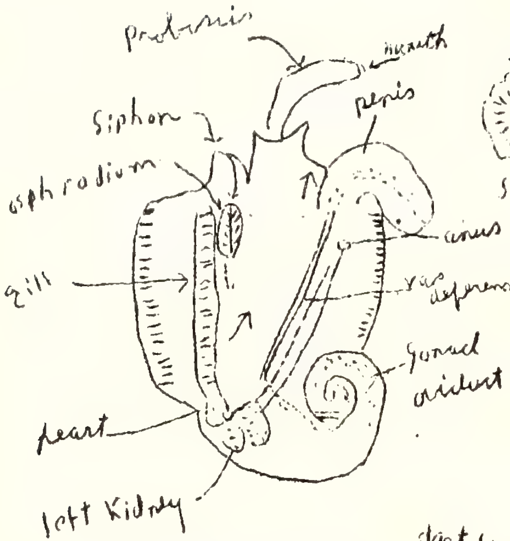
f.23. Toxoglossa
Conus californicus (T.B.)



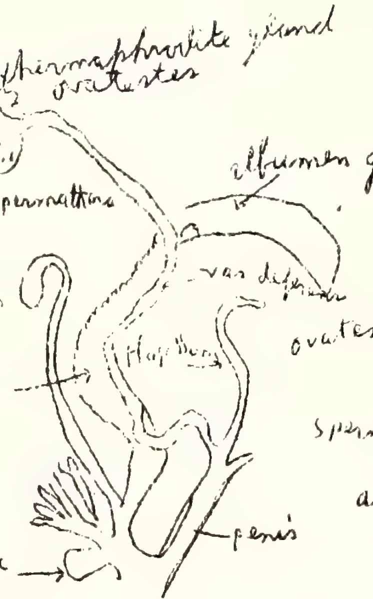
f.27. Pulmonata
sketch of entire radula of Helix.



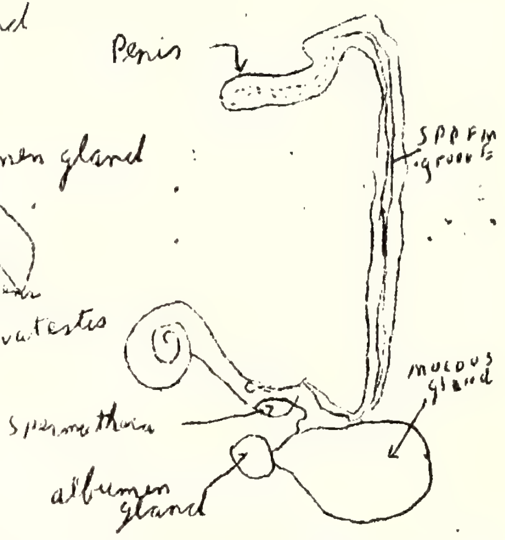
f.28. Cephalopoda
Loligo pallida (Tryon).


proboscis
mouth
siphon
penis
osphradium
gill
anus
vas deferens
gonad
heart
left kidney

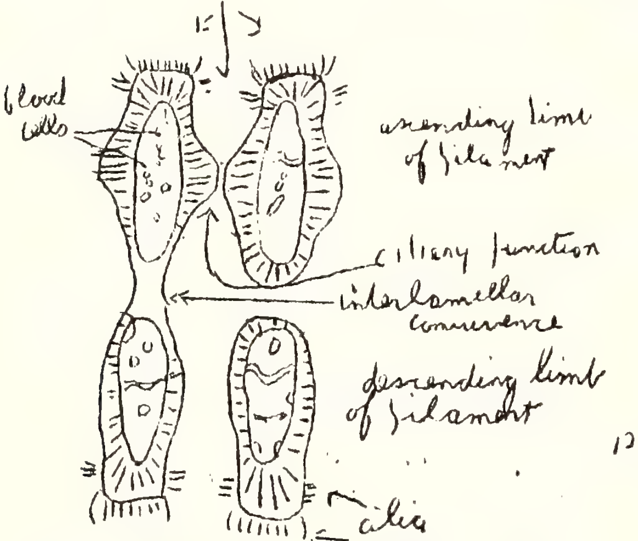
29a Streptoneura (Buccinum - B&P)


hermaphrodite gland
ovatestes
spermatheca
albumen gland
vas deferens
oviduct
Herm. duct
ovatestes
penis
dart sac

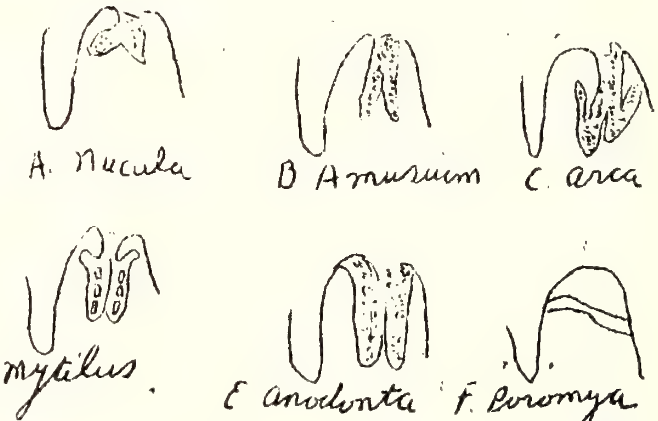
29c Pulmonata (Helix - B&P)


Penis
sperm groove
mucous gland
spermatheca
albumen gland

29b opisthobranchiata (Navanax - T.B.)


blood cells
ascending limb of filament
ciliary junction
interlamellar concrescence
descending limb of filament
cilia

30. structure of mytilus gill (horizontal section through two adjacent filaments (B & P)


A. Nucula
B Amusium
C. Arca
D Mytilus
E Anodonta
F. Poromya

31. Types of pelecypod gills (P. & H)

MINUTES OF THE DECEMBER MEETING OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIF.

The Conchological Club of Southern California met at the usual time and place Sunday, Dec. 3,1944; called to order by the President, Elsie M. Chace. There were 15 members present and 4 visitors. The visitors were: Margaret Sullivan, 2212 Manderville Canyon, Lily H. Clark, 1961 Lovelace Ave.,Los Angeles7, Calif. and Carolyn Halde, 1017 Tiverton, Los Angeles 24. The two last named expressed a desire to become club members and will be welcomed by all of us. The fourth visitor, John Q. Burch III, did not express a desire for membership though he beamed on all of us being a bit too young and shy for conversation; but there is little doubt he will, in time, be one of our number.

After many delays in transmission and mail delivery the information finally arrived that the little shell received from Mrs. Van Winkle was collected by her husband, an officer at Ascension Island, and if this were 1765 B.C. would be entitled to be called Pecten adscensionis Osbeck. Since that worthy gentleman did not comply with all the formalities of nomenclature and since the little ¼ grown shell had every marking of Pecten nodosus Linne var. or its equivalent Pecten subnodosus Sowerby it should probably bear one of these names (or be called Chlamys). If the shell were mine I am sure it would be adorned with the 1765 name- no matter what the " authorities" had to say to the contrary. At all events we were all glad to see it and a letter will be sent to Mr.and Mrs. Van Winkle telling them so.

The nominating committee, consisting of Morris Caruthers, Mrs. Irene Baker, and John Q. Burch, submitted as names for officers for the coming year: President, George Willett- Vice-President, Dr. Wendell O. Gregg- Secretary treasurer, Effie M. Clark. On motion made and carried they were unanimously elected.

The study of the lesson was then taken up with much of interest to talk about and a summary will be found elsewhere in the minutes.

At the close of the meeting the " Christmas Grab Bag" was exposed to those present, and if all were as pleased as the secretary at this foretaste of Christmas, a good time was had by all. The meeting was then adjourned.

Effie M. Clark, Secretary.

****

Collection For Sale - The collection of the late A.W. Hanham of British Columbia, Canada is offered for sale by Mr. Hanhams daughter. Those interested will please write Mrs. Violet Molesworth, 1176 Yates Street, Victoria, British Columbia, Canada.

None of us have seen Mr. Hanham's collection but many of us have in years gone by exchanged and corresponded with him. The collection represents a life time of work and contains many thousands of specimens.

****

F.G. Putnam, Route 2, Anacortes, Washington. We were very sorry to have a letter from Mr. Putnam advising that he suffered a back injury and has been disabled since last summer. He had just acquired a dredge and proper rigging and we were in high hopes of getting some fine and interesting material, He is recovering though and hopes to soon be his former self. Mr. Putnam prepares laboratory material and is at this time working with dogfish.

P.F.C. Lewis Van Winkle, 15362111, Co.K, 91st Infantry, A.P.O. 877, c/o Postmaster, Miami, Florida. This is the young man who collected shells on Ascension Island, Atlantic. His observations are interesting and he has been making a collection that should be of scientific interest. The home address is 5125 Stewart Ave., Cincinnati 27, Ohio.

We held this page open in the expectation of having something about the affairs of the Long Beach Shell Club but to date have received nothing. They will probably meet at their usual place in January.

****

Dr. T. Van Hyning, Florida State Museum, Gainesville, Florida. " I would very much like for you to publish the following notes in the minutes of your club. -- A few years ago I sent a small female Octopus with young and eggs to someone in California who was recommended to me as studying this family and the only reply I received was that they were working on west coast material. I have now lost the name of the person and would like very much to have these specimens returned as they were found here in Florida, annd twice since then I have read in your minutes of someone having received these tiny specimens from Florida. I now have a party at Yale University working on my large Florida collections that very much desires to see the specimens I sent to California."

Paul C. Hutchinson, S2c, USN Hosp. Corps. School, Co 21-1, San Diego 34, Calif. Mr. Hutchinson was much interested in conchology several years ago but that interest was replaced by a study of succulent plants. However, after visiting the San Diego Museumand seeing their fine exhibit of shells he has returned to the fold and is eager to receive all possible information particularly about mollusks from the Pacific as he expects to see duty in the South Seas. He has expressed a desire to receive our minutes and we are happy to welcome him to our circle.

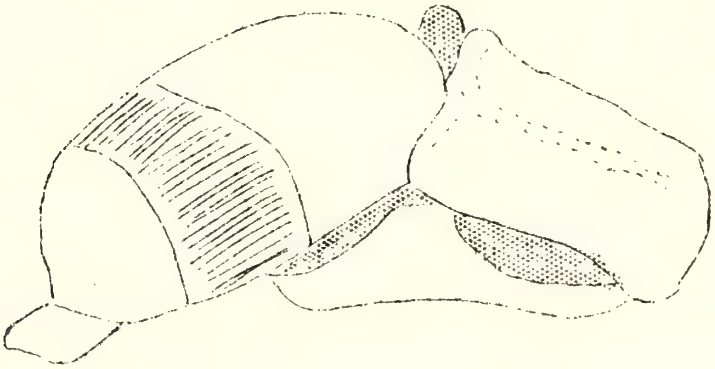
Harold Harry, Rt. 2, Box 222, Shreveport, Louisiana. Our friend Harry is now on his ship at sea somewhere. He is in the Navy as his friends all know. We recently received one of the very attractive V Mail Christmas greetings from him.

Mrs. Ruth Brookshire, 948 E. Beverley, Bellflower, Calif. The mother of our member Lieutenant Jack Brookshire, now and aviator and the last we heard stationed on Saipan. Jacks service address has been published several times recently and it is expected that his friends arewriting him direct. However, Mrs. Brookshire suggests that she is filing all papers, duplicates etc, and keeping them for Jack on his return. So it would probably be as well to send such papers to Jack at his home address. It is not generally known but 2nd class mail is not forwarded to the men serving overseas. In order to send a copy of our minutes to one of the boys it is necessary to put them in a sealed envelope and pay first class postage on it. We have been doing to to all of our members in the service but mention it here so friends of the boys will not just mail them a separate or something that will not be forwarded. Either send them firsy class direct to Jack or just mail them to him at the address above. The same thing applies of course, to all the other boys in the service.

Dr. L.G. Hertlein, California Academy of Sciences, Golden Gate Park, San Francisco, Calif. " I think that the minutes of the club are useful and much interesting information is being gathered together. I am always glad to cooperate in the good work and have gone over your preliminary notes each time with Allyn Smith and my suggestions have been included in his letters to you. There is of course much divergence of opinion regarding taxonomy and I have endeavored to follow a middle course in regard to generic units. Of course, I think that any valid change or correction should be made but where a great amount of splitting or lumping is based on some individual's idea it is open to question whether or not it may turn out to be generally accepted. You have certainly handled the presentation of the various ideas very well.".

#42- back page

Philine californica Willett, 1944
Redondo Beach, Calif. 50 fathoms 8/10/41



MK 411

This is a drawing of the animal from a photograph of the living shell. This is the only specimen we dredged and it lived in a habitat that was characteristic of a relatively small and hard to find area off Redondo Beach. The most outstanding feature of this was the vast numbers of foraminifera with which it was associated- about $\frac{1}{4}$ of a dredge haul would be almost pure forams. T.A. Burch.

****

Lt. Jack W. Brookshire, 9th Troop. Carr. Sqdn. A.P.O. 244, c/o P.M. San Francisco, Calif." Glad to receive your letter and the Minutes .. My Marianas collection is ever increasing. I have added over fifty new species to my collection in the past two months. All unidentified for the present, of course. I've made trips down into the Palau group but my collecting there is necessarily restricted. Lately I met one of those sharks of the man eating variety in his own element- almost in his own home. Those breakers over the reef were a terrific help. So far I've only been collecting those specimens that are found on rocks. I'll start working on the sandy bottom next month. At Enewitok one day in Sept. I got 20 Terebra maculata, 2 Terebra oculata, 2 Terebra dimidiata, Polinices pyriformis, a Cassis and (I think) smaller unidentified Terebras of different species. It was a good day. In my job with the Transport Air Group back in the Gilbert and Marshall Islands I frequented every major atoll tho I collected at only four- Apamama, Majuro, Kwajlein, and Enewitok. If Tom comes into the Pacific Area be sure to give his address to me. I'll probably be able to see him. " P.S. I really appreciate your efforts in obtaining a shell book of this area for me."

W.E. Griffiths, 24 (Aster) Melita St., Sliema, Malta. Mr. Griffiths writes that his shell collection suffered considerable damage from the bombing. No doubt his host of old friends and exchangers will take care of that very shortly after the resumation of normal shipping. He writes " ... The cause of the damage may have been through careless packing which was done by my children as I was on duty that fateful night of 10/11 June,1940 when Italy declared war at midnight. Every one was expecting air raids during the night in fact the first raid took place at 6:50 in the morning of the 11th of June. Effect of blast may have had something to do with it also, because the house I lived in had many near misses, in fact the house on the right and the one on the left as well as three or four in front were razed to the ground. Miraculously mine escaped damage but the effect of blast is tremendous and undescribable. ..."

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA
January 1945

The minutes and other publications of the Conchological Club of Southern California are not open to subscription. However, any of our friends interested in receiving them, may send us donations or stamps to help defray the cost of material and postage.

Any institution or library interested in filing these minutes is welcome to all available back issues and a place on our mailing list without charge. Students of particular problems are always welcome to ask us for specimens for study as well as all information we may have.

The next meeting will be held February 4, at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. at 2:30 P.M.
We are now meeting the first sunday of each month.

Please mail all news about shells, shell publications, shell collectors, shell trips, localities etc. to your editor,

John Q. Burch,
4206 Halldale Ave.,
Los Angeles 37, Calif.

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Inasmuch as members continue to send in their particular interests, we have decided to run our final membership list in the next issue. If you have not as yet sent in your data please do so at once.

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An excellent list of the marine mollusks of Argentine has been published. Carcelles, Alberto " Catalogo de los moluscos marinos de Puerto Quequen (Republica Argentina)" , Revista del Museo de La Plata (Nueva serie) Seccion Zoologia, tomo III, pp. 233-309, 15 pls., 1944.

The December, 1944 issue of the Proceedings of the Malacological Society of London, Vol. 26, parts 2 and 3, has been received.

The outstanding papers contained follow: " The Living Mollusc-I, In relation to its surroundings " By A.T. Hopwood; " English Eocene Eulimidae with notes on the torsion of Eulima and on Charlesworth's Illustrations" by A. Wrigley; " Geological Survey Museum notes" By A.S. Kennard; " Catalogues and collections" By J.R. le B. Tomlin; On Pseudolimea Arkell. " By L.R. Cox .

The interesting January Bulletin of the Natural History Museum of San Diego is at hand.

****

Dr. Maxwell Smith, Box 65, Winter Park, Florida is now curator of the Beal Maltbie Shell Museum at Rollins College. We predict that he will do great credit to this fine institution. " Your very stimulating Minutes are much enjoyed and all malacologists are indebted to you for the painstaking work you are doing in this connection. I am now curator of the Beal-Maltbie Shell Museum at Rollins College here and now engaged in bringing the collection up to date so far as nomenclature is concerned. It will take all of a year to install the new labels for the display cases alone. I am introducing many of my own large specimens, but have a private study collection at home which is available to those who wish to use it."

****

Don Edmonds, 922 N. Kingsley Dr., Los Angeles 27. Don suffered a severe shaking up in a motor cycle wreck recently. He was in the hospital for some time but is now happily recovering at home.

We regret to announce the death of Mrs. Ida O. Niles of Long Beach. She was affectionately known to most of us as " Monnie", and was the mother of Mrs. Leona Linderman and the grandmother of Mrs. Fred Barnett.

****

Charles B. Lee, 69 Verplanck Street, c/o Dickson, Buffalo 8, N.Y. This is the home address of our friend Pfc. Chas. B. Lee, 12168645, 2143 AAFBU, Sec . "A", T.A.A.F., Tuskegee, Alabama. Lee suggests that perhaps his conchological friends had better use the home address.

Alden Strong, 3532 Iris St., No., St Petersburg, 6, Fla. Mr. Strong advises that he has been changing address so frequently that his mail does not keep up with him. The above seems to be the latest.

Jose A. Freire, Heredia 305, Santiago de Cuba, Cuba. " The Grupo Humboldt of the Sociedad de Geografia e Historia de Oriente, of whose museum I am in charge, is anxious to get a few large colorful shells for display, so I will appreciate it very much if you will send me prices of the shells that fullfill that classification: large and colorful."

Inasmuch as we are not interested in selling shells to our friends it is possible that others interested in the sale of shells may see this notice.

However, we will be very glad to send some of our largest species to the museum in Cuba with no thought of pay. Our large west coast Haliotis are just about the only group I can think of that will fill the requirements of large and colorful so we are mailing a box of some 5 or 6 species of our California Haliotis.

W.J. Eyerdam, 7531 19th Ave., N.E., Seattle 5, Wash. " Your efforts in the compilation of reports on the distribution of the west coast shells has beenn richly rewarded, and I am sure that it is being appreciated more and more. The Minutes are becoming more valuable every year as a source of desirable information about mollusca. During the past year I have made considerable addition to my collection through exchanges. The largest single exchange that I have received was 410 species from Adele Koto, most of which are new to my rather large collection. I have also made exchanges with Powell of New Zealand and many of our own shell collectors. Received the returned Veneridae from you also a nice letter from Lt. Jack W. Brookshire from Saipan. I expect that some day if everything turns out O.K. I will make a lot of additions to my South Pacific shell collections through some of the fighting shell collectors."

Mrs. Margaret Veare, 681 Lafayette Ave., Buffalo 9, N.Y. Our friend Chas. B. Lee introduces us to Mrs. Veare . We hope to hear more of her.

****

Dr. A. Myra Keen of Stanford University sends some interesting notes about some of those we know. " Major Schenck is now Director of Training and Executive Officer of a Civil Affairs Training School in New Guinea. He has sent us several boxes of shells, he says, none of which has had time to arrive here yet. Later I hope to send you a list of species collected by him and by other collecting enthusiasts in New Guinea such as Sea-Bee J.M. Dowdle , who has already sent in over 90 kinds."

****

Ted Dranga, 4340 S.W. 14th St., Miami 34, Florida. Thanks for the check, Ted but we are always glad to hear from you. The beautiful necklace and bracelet of Cuban Polymita you sent Mrs. Burch last year is now being admired on the campus of U. of C. at Berkeley being worn by one of the sorority girls.

Ted's interests are the sale and purchase of world wide sea shells. My curiosity is aroused somewhat though by what he does with any mediocre shells he may come across. I have never seen a shell bearing Ted's label that was not a superlative No. 1 specimen.

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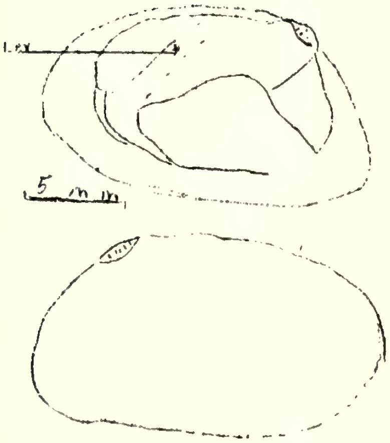
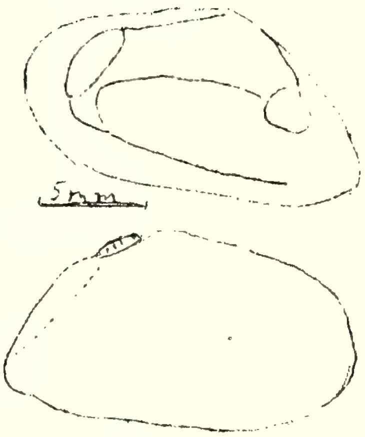
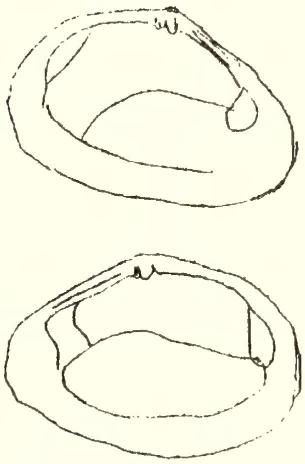


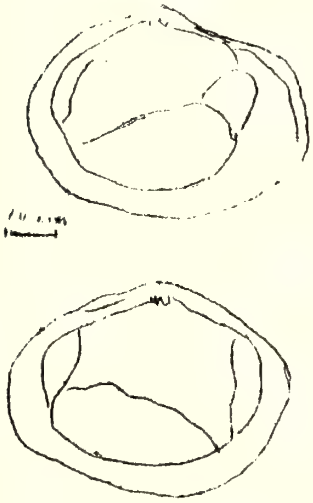
Tellina buttoni

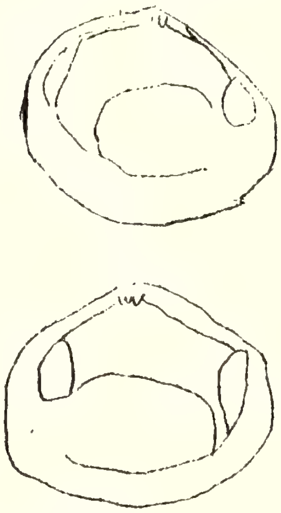


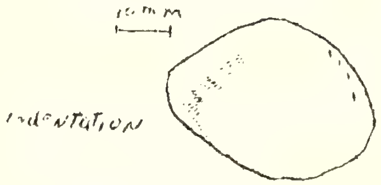
T. carpenteri



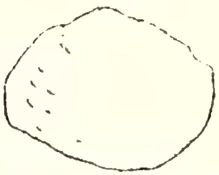
Macoma nasuta



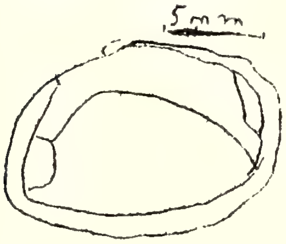


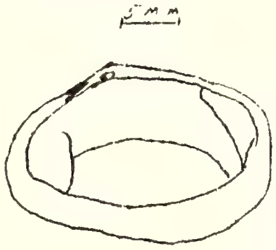

10 mm
indentation

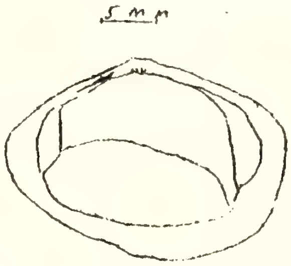
Macoma indentata

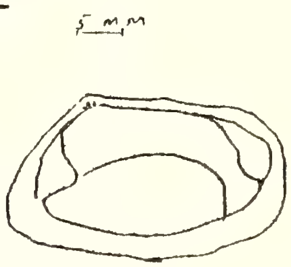


Macoma inquinata M. incongrua Macoma secta

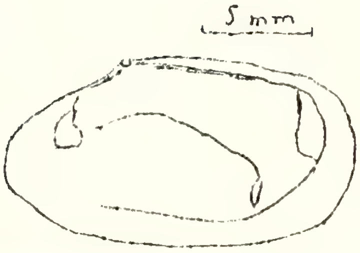




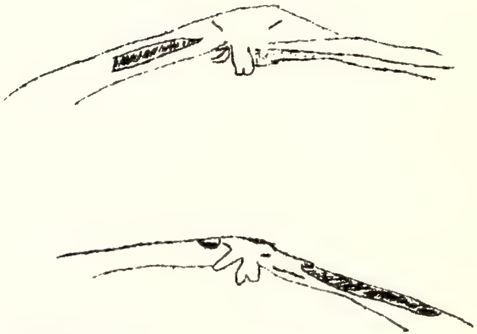




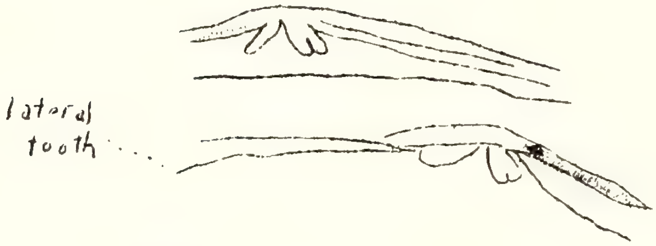
M. carlotensis M. quadrana M. planiuscula (topotype) M. alaskana



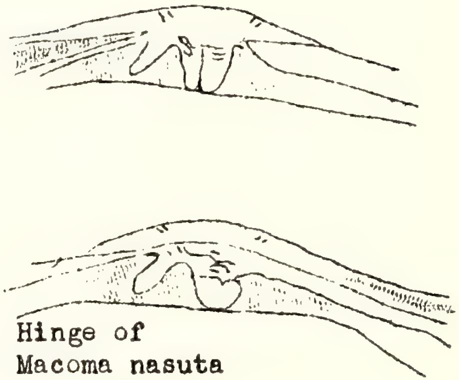
Macoma yoldiformis



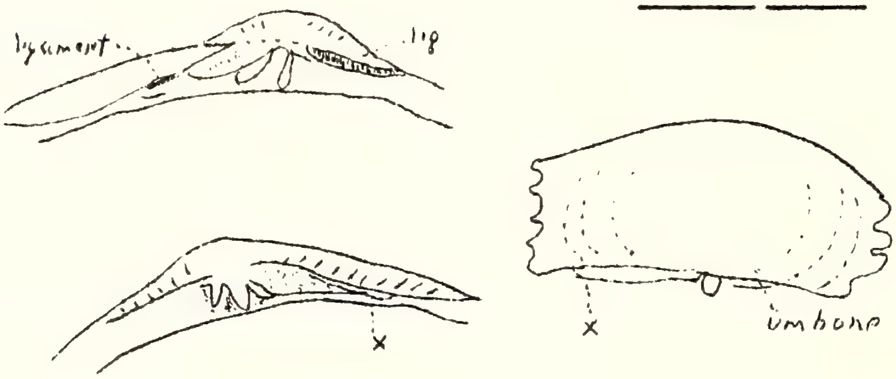
Hinge of
Macoma carlottensis


lateral
tooth

Hinge of
Tellina bodegensis



Hinge of
Macoma nasuta


ligament
lip
x
x
umbone

Hinge of *Apolymetis biangulata*

These figures have been retraced from the report on Tellinidae made to the club in July ,1943 and published in Minutes #25, 9-26. They are from the work of Beatrice L. and Thomas A. Burch.

Superfamily TELLINACEA   Key to Families

a. Valves slightly unequal and twisted.
   b. Resilium embraced in the ligament, subexternal ..... Tellinidae
   bb. Resilium internal, often on a distinct chondrophore. Semelidae
aa. Valves subequivalve, little twisted
   c. Shell subovate; ligament external and conspicuous ... Garidae
   cc. Shell subtrigonal or wedge shaped; ligament short, external, seated in a deep groove .... Donacidae

(The above key taken from Cotton and Godfrey " The Mollusks of South Australia).

Family TELLINIDAE

Genus Tellina Linnaeus, 1758. Type (by subsequent designation, Schmidt,1818), Tellina radiata Linnaeus.

" The shell is slightly inequivalve, compressed, rounded in front, angular and slightly folded posteriorly, umbones subcentral. The pallial sinus is very wide and deep, the ligament is external and prominent. Teeth 2,2; laterals 1,1."

This genus has been divided into three groups on the basis of lateral teeth by Dall, 1900 (Trans. Wagner Free. Inst.). However, his subgenera are subject to some discussion.

A. With two lateral laminae in each valve, those in the left valve always less strong.
   Subgenus Tellina s.s. However, Dr. Dall uses Tellina (Lam) with the type T. virgata Linnaeus Dr. A. Myra Keen advises on this matter as follows (Per. Comm. Dec. 1944) " Tellina s.s. must have the same type as Tellina s.l., namely , T. radiata . Tellina idae may be assigned to subgenus Tellinella Morch, 1853, type (designated by Stoliczka,1871, Tellina virgata Linnaeus."

B. With two lateral laminae in the right valve, one or both of those of the left valve absent or obsolete.
   Subgenus Merisca Dall, 1900 ex. T. declivis Sowerby.
   Subgenus Moerella Fischer,1887 ex. T. salmonea Carpenter.

C. Hinge with a strong right anterior lateral , closely adjacent to the cardinals, the left laterals absent, the posterior right lateral obsolete.
   Subgenus Angulus Megerle, 1811 ex. T. carpenteri Dall
   Subgenus Oudardia Monterosato,1885 ex. T. buttoni Dall.
   Subgenus Peronidia Dall,1900 ex. T. bodegensis Hinds.

Subgenus Tellinella " Gray" Morch, 1853. Type (by subsequent designation, Stoliczka, 1871), Tellina virgata Linnaeus.

" Shell of medium size, ovate to elongate ovate, posteriorly more or less rostrate and twisted to the right, with a fold in the right valve, and a corresponding furrow in the left, compresses, rather stout, white or yellowish, more or less broadly rayed with red or red brown; umbones prominent, median or slightly posterior. The sculpture consists of rather fine,strong, crowded concentric lirations, strongest and often sublamellar posteriorly, with fine microscopic radial threads, most prominent near the umbones. Ligament external,rather stout, dark brown, lying in a narrow elongate, depressed escutcheon, and situated on a rather stout, posteriorly truncate nymph. The hinge consists of two cardinals in each valve, one strong, triangular and grooved(the posterior one in the right valve,the anterior one in the left) and the other smaller, more slender and divergent; there are two laterals in each valve, those in the right valve strong,sublamellar,triangular, and those in the left valve rather low and somewhat fused with the margin. Interior white or yellow, often with red rays showing through; muscle scars typical, the posterior one suborbicular, the anterior one elongate. The pallial sinus is rather large, extending about four fifths or more of the distance between the two muscle scars" (Dall,Bartsch & Rehder- Molls. of Hawaii).

Tellina (Tellinella) idae Dall, 1891. " Santa Barbara Islands and San Pedro, Calif." (Dall). Type locality, Long Beach, Calif.

In our experience the range of this species along the mainland would be from Newport Bay north to Santa Monica, Calif.

Collecting data: San Pedro,Terminal Island,19855, Newport Bay 10/35, and not uncommon in the dredgings off Redondo Beach between 25 fms. and as deep as 50 fms. Specimens from San Pedro are difficult to identify because of the fact that so much fossil material is washed into the bay that it is confusing to determine whether or not the specimen is Recent or fossil(Burch)

Young specimens are equilateral and triangular in shape with much coarser sculpture than the adults. In fact,the very young are common in the Redondo Beach dredgings and usually take a second look to classify on the first trip.

Subgenus Merisca Dall, 1900. Type (by original designation), Tellina crystallina Wood. ".... the laterals of the right valve are strongly developed but the left valve is without lateral teeth, its margin fitting above the laterals of the opposite valve.." (Dall).

Dr. Dall used Merisca as a section of the subgenus Arcopagia Leach,1827 of which Dall says " posterior left lateral absent, and the anterior obsolete, other teeth normal". It seems that the strongly developed right laterals are sufficient to distinguish this section as a subgenus.

Tellina (Merisca) lamellata Carpenter,1857. " San Diego, Calif. to Mazatlan" (Dall). Type locality, Mazatlan.

None of the members report having taken either this species or the following. However, Mr. A.M. Strong comments " Know of no records for these species. However, they both range up along the Lower California coast and strays could come up as far as Catalina."

Tellina (Merisca) declivis Sowerby, 1868/ " Catalina Island, Calif. to Panama" (Dall).

Subgenus Moerella Fischer, 1887. Type (by monotypy), Tellina donacina Linne.

" Shell small, compressed, hardly folded, acute behind, rounded in front, with feeble concentric sculpture; left laterals obsolete; no interior radii; the sinus long, coalescent with the pallial line below" (Dall,1900).

Dall says this section is closely related to Angulus but has the laterals better developed and is without the internal radii.

Tellina (Moerella) salmonea Carpenter, 1864. " Aleutian Islands to San Pedro, Calif." (Dall). Type locality, Monterey, Calif.

Collecting data: Umnak Island, Atka Bay, Forrester Island, Alaska- Malaga Cove, Los Angeles county, Calif.- S. Coronado Island in 15 fms. (Willett) dredged off Pacific Grove, Calif. Aug. 1937 in 15 fms. sand (Burch); Drier Bay, Knight Island, Afognak Id., Mitrofinis Id., Sitkalidak Id., Kodiak Id ., Alaska and Dutch Harbor,Unimak Id.,Atka Id. Aleutians (W.J. Eyerdam); Hinchinbrook Is. coll. by Ingvar Norbegg (Eyerdam).

Before 1922 a number of specimens were taken from San Pedro Bay. This seems to be one of quite a number of species which Mr. A.M. Strong found before the dredging and filling operations.

Tellina (Moerella) meropsis Dall, 1900. " San Diego, Calif. to Gulf of California" (Dall). Type locality, San Diego, Calif.

Collecting data: San Diego and La Jolla, Calif., April 1935(Burch); San Diego Bay, 1916 (Chace); San Diego Bay, common (W.K. Emerson).

Subgenus Angulus Megerle, 1811. Type(by subsequent designation, Gray,1847), Tellina lanceolata Linnaeus.

" Shells elongated, variable in size but chiefly small, compressed, with the posterior end angularly pointed and not twisted, the surface smooth or with fine concentric sculpture; nymphs short and prominent, the ligament short; hinge with a single adjacent lateral well developed in the right valve anteriorly; internally a thickened ray passes from the umbo just behind the anterior adductor scars and one or two narrower similar rays in front of the posterior adductors, often stronger in the left valve, the posterior rays sometimes obsolete; sinus largely or wholly coalescent with the pallial line below" (Dall).

Tellina (Angulus) carpenteri Dall, 1900. " Forrester Island, Alaska to Gulf of California" (Dall, 1921) " Panama" (Dall,1908). Type locality, Monterey and Catalina Island.

Collecting data: The bathymetric range of this species is somewhat amazing. We have collected it in great numbers in such sloughs as Anaheim Bay,Mugu,Newport Bay etc. apparently spawning in the summer months, and have also dredged it at all depths down to below 100 fathoms off Redondo Beach, Calif. Dredged off Monterey,Calif. in 40 fms. 8/1937. Specimens dredged off Santa Monica in shallow water 12/1936 have no pink color in them as have the typical specimens. Dredged in abundance off Ensenada, Mexico and also taken in the Estero below Ensenada. (Burch).

Comment on this species by Beatrice L. and Thomas A. Burch , Minutes Conch. Club. So. Calif. #25,p. 12 " Resembles T. modesta and T. buttoni . It is glossy, flat, narrow,hardly ½ inch long (Keep). It can be distinguished from T. buttoni by the absence of a ray behind the anterior muscle scar. There is a slight difference in sculpture. The T. buttoni has a blunter posterior end. The color ranges from white, pink stripes,through solid pink, even purplish. Many collectors note that they find specimens lacking in pink but the Burches find many colored forms. Mud bank forms are usually pink and smaller than the sand forms. Mr. George Willett notes that the Forrester Island, Alaska specimens are more striped and of a muddy yellow with rays"

This species is amazingly common when found. To quote from A.M. Strong, 1922 " This species is to be found in large numbers in the shallow water of the upper portions of the tide channels at Anaheim Bay, living just under the surface of the black ooze. It is also dredged in Catalina Harbor (CEW and AMS). Formerly (before 1920) plentiful in San Pedro Bay (Tremper).

Tellina (Angulus) tabogensis Salisbury 34 " Catalina Island, Calif. to Panama" (Dall). Type locality, Panama Bay. (T. panamensis Dall,1900.)

The question of just what this species is has been the subject of a great deal of discussion between local collectors. We have a statement on it from Mr. A.M. Strong (Per. Comm. Dec. 1944) " Have specimens dredged off Catalina so identified by Dall. They are very small, pure white and smooth. I can see nothing which would distinguish them from the young of the white phase of T. carpenteri Dall. The Beebe-Crocker Exped. material contained many small valves of Tellina which I could not place. Tellina panamensis Dall , if there is such a thing, should be among them. " T. tabogensis, new name for panamensis (Proc. Malac. Soc/ vol.21,pt.2,p,86,1934.

Subgenus Oudardia Monterosato, 1885. Type (by original designation),Tellina oudardii Payraudeau -- Tellina compressa Brocchi.

" with a thick internal anterior rib" (Dall, 1900).

Tellina (Oudardia) modesta Carpenter, 1864. " Vancouver Island to Lower Calif." (Dall). Type locality, Puget Sound.

Beatrice L. and Thomas A. Burch in Minutes #25, p. 13 discuss this species as follows: " This is a typical sand shell, found only by dredging. The shell is small, white, rather short, with a thick but rather obscurely defined ray behind the anterior adductor scar. The Burches have dredged some specimens off Santa Monica, Calif. which appear to be intermediate between T. modesta and T. buttoni. Therefore these may be but varieties of the same species."

Dall placed this species in the subgenus Angulus which does not have an internal rib even though the species is described as having an internal rib. It seems clear that T. modesta should be placed in the subgenus Oudardia."

Collecting data: Dredged off Avalon, Catalina Island in 35 fms. 8/1937, off Monterey, Calif. in 20 fms. shale bottom 8/1940, off Santa Monica in 10 fms. sand 12/1935, off Redondo Beach, Calif. in 25 fms. sandand gravel 12/1937, off Malaga Cove, Los Angeles Co., Calif. in 15 fms. sand (Burch): off South Coronado Island in 10 fms. (G. Willett); Victoria, B.C. in 5 fms. (Lewis) (Willett).

Tellina (Oudardia) buttoni Dall, 1900. " Lituya Bay, Alaska to the Gulf of California" (Dall). Type locality, Guadalupe Island, Lower California.

Comment from Minutes #25, p. 13 " The shell is white, the surface concentrically grooved with the sculpture stronger on the right valve anteriorly. There is a well thickened ray behind the anterior adductor scar."

Collecting data: Morro Bay, Calif. 10/1936, and 5/1940 on sandy shore, Cauyocos, Calif. 1940, Monterey, Calif. 8/1937 in 10 fms. and 25 fms. and 8/1940 in 20 fms. on shale bottom, Mugu, Ventura Co., Calif. 12/1937 from sand bat, off Redondo Beach, Calif. in 25 fms. 12/1937(Burch)

From Mr. A.M. Strong we learn that these were formerly to be found in large numbers at the westerly end of Terminal Island (Tremper). Quite a number of specimens dredged in Catalina Harbor in about 3 fms.

Subgenus Peronidia Dall, 1900. Type (by original designation), Tellina albicans Gmelin.

" Shell without laterals, having the characters of Angulus s.s. and the external appearance of Eurytellina." (Dall).

Tellina (Peronidia) bodegensis Hinds, 1844. " Queen Charlotte Islands, British Columbia to Gulf of California. Japan?" (Dall, 1921). Type locality, Bodegas Bay, California.

Comment on this species from Minutes #25, pp 14-15 " This is a beautiful species but difficult to distinguish from Tellina santarosae Dall. The editors believe the two are synonymous; T. santarosae the more southern form. Further discussion of these species is found under T. santarosae. "

MacGinitie notes (1935) that Tellina bodegensis has long, split siphons and that the incurrent one is much longer than the excurrent one. Portions of the siphons often autotomize when the clam is disturbed. In the slough in which he worked, he found that if the species were left exposed too long by a low tide, they came to the surface in search of water and remained at the surface. Mr. and Mrs. E.P. Chace note that T. bodegensis crawls on edge just below the surface of the sand leaving a slit like groove.

This species is found in bays, in shallows, and also in deepwater.

Older forms show a tendency to thicken the shell from the inside.

Mr. George Willett believes that T. bodegensis and T. santarosae are not identical but just similar.

Collecting data; Morro Bay, Calif. just beyond the breakwater, June 1935, adult alive; Crescent City, Calif. (E.P. & E.M. Chace); Pacific Grove, Calif. Aug. 1937, 15 fms., Santa Cruz Island, young forms dredged in 10 fms., Terminal Island, San Pedro, San Diego, Calif. shore, Anaheim Landing, one valve (Burch).

Tellina (Peronidia) santarosae Dall, 1900. " Santa Barbara Islands and San Diego, Calif."(Dall) to Ensenada, Lower California, Mexico (Burch). Type locality, Santa Rosa, Island, California.

Comment by Beatrice L. and Thomas A. Burch in Minutes #25, p. 15 " This species is flat, thin and less bent posteriorly than T. bodegensis. Also the typical T. santarosae, on the posterior fourth of the right valve has much narrower interspaces which are elevated. The left valve sculpture is more feeble than the right. It never seems to thicken on the inside of the shell as does a typical old *T. bodegensis*. The southern form, *T. santarosae* seems to be so similar to the more northerly *T. bodegensis* that it is exceedingly difficult to separate them especially in these local regions in which they overlap."

In the discussions of this group the following note was made by John Q. Burch " Dr. Dall in his discussion of this species states " This form, which may prove a special race of *Tellina bodegensis* , ...". In my opinion we have here another of the many species in which the northern specimens differ from those from the south. It must be conceded that a typical specimen of adult *bodegensis* is quite different from a typical specimen of adult *santarosae*, that is, if you take your *bodegensis* from northern California and your *santarosae* from perhaps Ensenada, Mexico. I am not in favor of putting *santarosae* in the synonymy because it seems to be certainly a good subspecies if it is not a species. I suggest *Tellina bodegensis santarosae* Dall." However, this theory did not meet with the approval of the majority and the consensus of opinion is to retain the two species as distinct.

Collecting data: Anaheim Landing, Calif. 1937, Ensenada, Lower Calif. Mexico June 1938, and many dead valves washed up on the beach (Burch); living specimens taken with *T. idae* at the time of the first dredging in San Pedro Bay (Mrs. W.H. Eshnaur); formerly plentiful on the ocean side of Terminal Island (Tremper).

Tellina (Peronidia) lutea Wood,1828. " Arctic Ocean, Bering Sea, North Hapan , the Aleutian Islands and east to Cook's Inlet, Alaska" (Dall,1921).

Dr. Dall in Bulletin 112 and other authors have given ' Gray 1828' as the author of this species. Dr. A. Myra Keen (Per. Comm. Dec. 1944) explains this as follows " According to the International Rules, the author of a species name is the person who publishes it; Wood published the name from Gray's manuscript museum label. One could write " Wood, ex Gray MS", but not just"Gray". The type locality for this species was not given in the original; Mrs. Oldroyd's mention of Icy Cape is incorrect".

Collecting data: Unimak Island and Kodiak Island, Alaska, 1926 (Willett); Kukak Island, Alaska 3/15/36 (G. Willett); Nunivak Island in 3 fms.(Lewis); Izhut Bay, Afognak Id.,1922-- Mitrofania Id., and Uyak, Kodiak Id.,1928, Unalaska and Bering Id., 1932 and Raspberry Id., Alaska 1939 (W.J. Eyerdam).

Tellina (Peronidia) lutea venulosa Schrenck, 1861. " Schumagin Islands, Alaska; Sakhalin Island, Japan" (Dall, 1921). Type locality according to Dr. A. Myra Keen is " Sakhalin Island".

Collecting data: Gulf of Peter the Great, East Siberia, 1938 (Eyerdam).

Genus *Apolymetis* Salisbury,1929. Type (by monotypy), *Tellina meyeri* Phil. -- *T. meyeri* Dunker (fide Grant and Gale,1931).

Metis H. & A. Adams as used by Dall and others is replaced by *Apolymetis* (Salisbury, Proc. Malac. Soc. Lon. vol. 18, pp 255 & 258).

" Shell suborbicular, compressed, valves sillonated, posterior flexuosity submedian; no lateral teeth" (Tryon S.S. Conch.).

Apolymetis biangulata (Carpenter), 1856. (*Metis alta* Conrad)

" Santa Barbara, Calif. to San Diego" (Dall, 1921) extended to Ensenada, Mexico (Burch).

Dr. A. Myra Keen advises on this species as follows (Per. Comm. Dec. 1944) " The type locality of *Apolymetis biangulata* (Carpenter) is Santa Barbara. The date is 1856, not 1855 as given in my check list. The description was published in the P.Z.S. for 1855, but in a part that did not actually appear until 1856. The original description follows:

? Scrobicularia biangulata

? S. t. suborbiculari, subaequilaterali, convexiuscula, striis concentricis vix regularibus, postice undata, angulis duobus subobsoletis; ligamento externo tenuissimo, in sulcos alte impresso, semi-interne sito; ligamento interno fossa trigonali scalena sito, altori adjacente; dentibus cardinalibus in utraque valve duobus, contiguis, vix radiantibus; cicatricibus muscularibus subovalvibus, sinu pallii maximo; alba, intus aureo tincta. Long. 1/5, lat. 1/78, alt. .. 8 poll. Hab. Sta. Barbara"

Collecting data: Formerly plentiful around Terminal Island (Tremper); also from A.M. Strong,1922 " valves not uncommon on the beach at Terminal Island in 1912 and 1913. These may have come from dredging in San Pedro Harbor. I have taken a few small ones at different times in Anaheim Bay (E .P. Chace); dredged off Redondo Beach in 25 fms. gravel, collected littoral on Terminal Island, 1936, Anaheim Bay, Huntington Beach, dead valves by the hundreds, living specimens few, in upper Newport Bay, 1937, dug from fine sand about 6 inches deep and about 20 living adult specimens, Mugu Bay, Ventura Co., Calif. 5/1937 , Mission Bay, San Diego Co. 1936-1937, alive but not common, in the Estero de Todos Santos Bay below Ensenada, Mexico 11/1937 (Burch); reported from Mission Bay but not common (W.K. Emerson) ; common in San Pedro Harbor just outside the outer harbor berths (E.P. Chace).

Genus Macoma Leach, 1819. Type (by monotypy), Macoma tenera Leach-- Tellina calcarea Gmelin.

" Shell without lateral teeth; of a rounded subtrigonal shape, usually but slightly inflated, generally with a marked posterior flexure; sculpture lacking or of feeble concentric growth lines; pallial sinus generally confluent with the pallial line".

Quoting from Minutes #25, p. 17 " The Pacific Coast Macomas may be separated into four groups,

1. A miscellaneous group
2. A group resembling M. nasuta in shape
3. The M. quadrana and carlottensis group.
4. The M. indentata group. Usually placed in Section Rexithaerus.

In the second group, M. nasuta is easily distinguished since the pallial sinus in the left valve reaches the anterior adductor scar. M. inquinata is more equilateral than M. nasuta but not as much as M. incongrua which is also more inflated."

Macoma middendorffii Dall, 1884. " Bering Strait, south to the Commander and Aleutian Islands and eastward to Chirikoff Island, Alaska" (Dall,1921). Type locality, Bering Island

" Recognizable by its high triangular form, solid shell, with broad hinge plate and flattened left valve" (Dall, 1900).

Collecting data: Gulf of Kronotsky, Kamchatka, 1925; Nome, Atka Id.; Bering Sea, Alaska 1932 (W.J. Eyerdam).

Macoma incongrua (Martens), 1865. " Arctic Ocean, south to Japan on the west and to San Diego, Calif. on the east" (Dall, 1921). Type locality, Yokohama, Japan.

Comment from Minutes #25, p. 19 " Distinguished from M. inquinata in being more inflated and equilateral. This shell seems to be identical with M. inquinata arnheimi Dall. Found in soft muddy sand."

Collecting data: Kodiak Island, Alaska to Tacoma, Wash. (G. Willett); Nunival Island, Bering Sea, in 10 fms. (Lewis) (Willett); taken in many localities in Alaska (W.J. Eyerdam).

Macoma brota Dall, 1916. " Bering Sea to Puget Sound" (Dall,1921). Note by Dr. A. Myra Keen " The type locality of the holotype of Macoma brota is

Puget Sound".

Comment, Min. #25, p. 19 " Surface dull; umbones further posterior than M. calcarea".

Collecting data: Wrangel, Alaska in 60 fms. (G. Willett); Unalaska and Atka Island, Aleutian Islands (W.J. Eyerdam); Aputan Island, Aleutian Islands (Ingvard Norberg) (Eyerdam).

Macoma brota lipara Dall, 1916. " Bering Sea to Puget Sound" (Dall, 1921) . Dr. A. Myra Keen advises that the type locality of this species is off Queen Charlotte Islands in 142 fathoms.

Comment, Minutes #25, p. 19 " Similar to M. inquinata, live in muddy sand".

Collecting data: Ketchikan and Unilaska, dredged (G. Willett);.Craig, Alaska (Willett); Kodiak Island (Lewis) (Willett); Atka Island, Aleutian Islands, and Elk River, Oregon(Pleistocene)(W.J. Eyerdam). Eyerdam comments on this species as follows " Although perhaps not a variety of M. brota it is not exactly the same as M. inquinata and should be allowed to stand".

Macoma sitkana Dall, 1900. " Kodiak Island to Lituya Bay and Sitka, Alaska" (Dall, 1921). Type locality, Sitka Harbor, Alaska.

" Shell like Macoma calcarea, but more slender, more equilateral, less flexuous, with the pallial sinus more regular, oval, and confluent below, and with the posterior end somewhat recurves dorsally" (Dall, 1900).

Collecting data: Izhut Bay, Afognak Island, Alaska, 1932 (Eyerdam).

Macoma calcarea Gmelin, 1792. " Arctic Ocean to North Japan and to Monterey Bay, California. Circumboreal." (Dall, 1921). Type locality, Iceland or Faeroes (Dr. M. Keen). Johnson gives the Atlantic range " Greenland to Long Island Sound 5-40 fms."

Comment, Minutes #25, p. 20- " Similar to M. brota but with a chalky shell and with the posterior flexure more pronounced. The species prefers deep water, or, at least, is not littoral or estuarine" (Dall, 1900).

Collecting data: Wrangel, Alaska in 60 fms. (G. Willett); Punuk Id., Bering Sea in 15 fms. (Lewis); Izhut Bay, Afognak Id., Alaska, 1922 (Eyerdam) and the following sets in the Eyerdam collection : Godhaven, Greenland (Torrell), Luartlek,Headland, Spitzbergen, Koefjord, Swedish West Coast.

Macoma moesta (Deshayes), 1854. " Arctic Ocean ,Bering Sea and eastward to the Shumagin Islands. Circumboreal." (Dall, 1921). Type locality, Northern Ocean.

" The species is characterized by its oval compressed form, low posterior beaks, and short, hardly flexed posterior end" (Dall in discussion of M. krausei Dall, 1900)

Macoma krausei Dall, 1900 was apparently placed in the synonymy of moesta by Dall himself. However, a number of authors use krausei. Johnson " Moll of Atlantic" lists M. krausei Dall, 1900 from Greenland.

Macoma nasuta (Conrad), 1837. " Kodiak Island and Cook's Inlet, Alaska , south to Scammons Lagoon, Lower California" (Dall, ,1921). Type locality, near San Diego, Calif.

Comment. Minutes #25, p. 18 " M. nasuta can be readily distinguished from other west coast Macomas since the pallial sinus in the left valve reaches the anterior adductor scar."

Weymouth states " It is a hardy species, flourishing under conditions speedily fatal to many other forms. This is particularly true of brackish water which is encountered in small lagoons with little, or only intermittent communication with the oceans, and its wide distribution undoubtedly depends on this hardiness. The most favored locality is in fine mud little exposed to wave or current and it is regularly found in mud too soft for any other species" (Fish and Game Bull. #4, Calif. Fish and Game).

" In April, 1943, we collected M. nasuta in Newport Bay and observed that they lived about six inches beneath the surface of the mud with the long axis parallel to the surface of the mud and the umbones uppermost. The animals were arranged around Callianassa burrows, and hence we assumed that these specimens extended their siphons into the burrows instead of to the surface of the mud." (Min. #25, p. 18).

Collecting data: One of the most common species the length of the coast in sloughs and also the opean ocean. The bathymetric range in our experience goes down as deep as 25 fms. off Monterey, Calif. and also off Redondo Beach, Calif. (Burch); Craig and Ketchikan, Alaska (G. Willett): note on the species from W.J. Eyerdam follows " This is our commonest Macoma on Puget Sound. It is apparently uncommon in Alaska as I have only found a few specimens on Afognak Id. and in Prince William Sound."

Macoma irus (Hanley) , 1845 (Macoma inquinata (Deshayes), " Bering Strait to Japan on the west and to Monterey Bay, California on the east" (Dall,1921) extended to Terminal Island, San Pedro Bay, Calif. (Burch).

Dr. A. Myra Keen advises as follows regarding this species (Personal Comm. Dec. 1944) " Salisbury, Proc. Malac. Soc. vol. 21, 1934, p. 85, points out that M. irus of Hanley has priority. It was described without locality in 1845 (Proc. Zool. Soc. for 1844, p. 166). Salisbury figures the holotype (pl. 12, figs. 7,8), which is at the British Museum, and also the holotype of Deshayes' M. inquinata (pl. 12, fig.5). The original description of Hanley's species follows:

Tellina irus " Tel. testa ovata aut obovata, crassa (in adultis), subventricosa, subequilaterali, impolita, extus intusque albida, concentrice fugulosa; rugis interruptis minimus, confertissimis, subelevatis; margine ventrali magis minusve arcuato; dorsali antice convexo et subdeclivi, postice convexiusculo, elongato et declivi; latere antico paululum breviore, rotundato; postico inferne angulato; lunula (in adultis) parva, profunda; ligamento infosso; costa umbonali subobsoleta; dentibus satis magnis. Long. 1.10; lat. 1.40 poll.

Comment, Min. #25, p. 18 " Distinguished from M. nasuta since pallial sinus does not reach the anterior adductor scar in either valve and from M. incongrua by being less inflated. Found usually in soft muddy sand."

Collecting data: Kodiak, Dall Id., Ketchikan, Alaska (G. Willett); Terminal Island, Los Angeles County, winter of 1934, washed in alive after storm; Morro Bay, Calif. 1936 and also 6/1940, not common; San Francisco Bay, San Mateo 1/1938 ; Port Orchard, Wash. 3/1936 and Alki Point,Seattle, Wash. common (Burch); Akutan Id/ (Norberg); Atka Id. (W.J. Eyerdam, 1932)

Mr. Eyerdam obviously considers irus and inquinata two species and makes this comment on irus " This seems to be an overgrown thick-shelled variety of Macoma inquinata." Eyerdam also makes the following collecting notes for M. inquinata " Not uncommon in Puget Sound; also collected by Eyerdam in Alaska at the following places, Izhut Bay, Afognak Id., Mitrofania Id.,Knight Id., and Unalaska Id. Often together with Macoma incongrua Macoma nasuta, Saxidomus giganteus and Protothaca staminea."

Macoma inquinata arnheimi Dall, 1916. " Kodiak Island, Alaska and south to San Francisco" (Dall,1921). Type locality, Kodiak Island, Alaska.

Dall, 1900, described this as a variety " Shell resembling the typical inquinata but shorter, and relatively more plump ..."

In Minutes #25, p. 19 the authors expressed the opinion that this species seems to be identical with M. incongrua (von Martens).

However, we have the following note from Mr. W.J. Eyerdam along with collecting localities " My specimens which were identified by the U.S. National Museum do not resemble M. incongrua as has been suggested but are much closer to typical M. inquinata. Perhaps the southern shells are different or there has been a mistake in determinations"- Eyerdam reports it from: Afognak Id. and Raspberry Id. , in Kodiak Ids. and Evans Id. and Knight Id., in Prince William Sound, Alaska: and Akutan Id. collected by I. Norberg.

Macoma inconspicua (Broderip and Sowerby), 1829. Arctic Ocean to San Diego. Dall in Bulletin 112 listed our west coast species as M. balthica Linnaeus,1758. A number of later authors have considered inconspicua a subspecies of balthica. We are of the opinion that inconspicua is a good valid distinct species. Dr. A. Myra Keen advises on this as follows (Personal Comm. Dec. 1944) " Macoma inconspicua (Brod. and Sby., 1829), described as Tellina, was figured by Gray in Zool. Beechey's Voyage, pl. 41, fig.6. The original description: " T. testa obovata, sublenticulari,antice breviore; ligamento magno,dentibus cardinalibus parvis,lateralibus nullis; long. 19/20, lat. 4/10. alt. 15/20 poll. Hab. in Oceano Arctico.

From Icy Cape. It bears a general resemblance to Tellina solidula, but it has not the acuminated posterior extremity of that species. A thin corneous epidermis is observable on the lower edges, but the umbones are eroded, and a great part of the surface has a chalky appearance. The remains of the dried animal were still within the shells from which this description was made. We have only seen two specimens, one of which is colourless, the other has a flesh-coloured surface with darker umbones."

In shape and texture it seems to differ enough from M. balthica to warrant specific differentiation. In fact, I am puzzled as to why the identification as balthica was ever made for our west coast form."

The above statements by Dr. Keen check exactly with the opinions of other members reporting the species. In the discussion John Q. Burch made the following note which was generally accepted " An examination of the sets in our collection indicate that the Pacific specimens are quite different from the Atlantic shells. Johnson " Moll. of Atl. Coast" gives the range of balthica " Arctic Ocean southward in deep water to Georgia". It is apparently rather common over there since we have at least 8 or 9 sets from Maryland north to Cape Cod. None could possibly be confused with our specimens from Puget Sound."

Collecting data: Ketchikan,Craig, Dall Id., Alaska (G. Willett); Alki Pt., Seattle, Wash., Puget Sound, Aug. 1936, also Raymond, Wash. and other lagoons along the Washington coast and along the Oregon coast in bays (Burch); Drier Bay, Knight Island, Alaska 1923.. dredged in mud (W.J. Eyerdam). Mr . Eyerdam attached a note to this report as follows " This variety is quite different from any of the shells in the more than 20 lots of typical Macoma balthica in my collection and can easily pass for a distinct species." Eyerdam also sent in an interesting report on a Macoma balthica var fragilis Dall which was collected at Izhut Bay, Afignak Island, Alaska and identified by Dr. Dall, in 1922. Eyerdam comments on this " As this collection closely resembles some of the more typical M. balthica it is possible that Dall intended the Pacific form as a variety of the European species. I doubt whether there is enough difference to make ours a variety".

So the question remains of the possibility of not one but two or more species being involved here.

Macoma inflatula Dall ,1897. In synonymy of M. carlottensis which see.

Macoma leptonidea Dall, 1895. " Santa Barbara Channel. Also Texas coast. " (Dall, 1921). Type locality, Matagordo Bay, Texas.

" Santa Barbara channel, California, in 314 to 322 fathoms. Also at Matagordo Bay, Texas. This very distinct species occurs in shallow water on the Texas coast and in very deep water on the coast off California/ It probably antedates the separation of the two oceans." (Dall, 1900).

This is an interesting situation at least. There is no record of the species ever being taken since the description. The species was described in Nautilus IX, July, 1895, p. 33 and later figured in 1900, Proc. U.S.N.M vol. 23.

(next)

The original description of this species is easily available in Oldroyd and the only additional comment by Dr. Dall at the time follows: " This little shell looks curiously like a Lepton. Its outline though larger differs little from that of Lepton longipes Stm."

Macoma oneilli Dall, 1919. " Dolphin and Union Straits, Arctic Coast"(Dall).

We mention this species because Dr. Dall listed it in Bulletin 112. However, it has been generally omitted from west coast faunal lists. Dr. A. Myra Keen advises as follows (Per, Comm. Dec. 1954) " I omitted Macoma oneilli because the type locality is so far east of Icy Cape, Alaska, that it seemed unlikely the species is part of our fauna". And George Willett comments " Not known from west coast". We will, therefore follow this plan.

Macoma kelseyi Dall, 1900. " Living in Puget Sound" (Oldroyd) extended to Coos Bay, Oregon (Keen). Described from the Pleistocene of San Diego, and so listed in Bulletin 112 by Dall. Dr. A. Myra Keen advises on this species (Per. Comm. Dec. 1954) " Macoma kelseyi was collected in Puget Sound by the Oldroyds. Recently a Stanford student, Maxwell S. Doty, showed me a valve of what I identify as M. kelseyi from Coos Bay; the preservation of the specimen suggested that it might be sub-fossil, but fossil or living, this constitutes a new record for the species."

Grant and Gale make it a subspecies of nasuta calling it Macoma nasuta kelseyi Dall. Dall, 1900, following the description stated " closely related to M. nasuta Conrad from which it differs as follows: it is larger heavier, and flatter than any specimens of M. nasuta yet recorded.."

Macoma quadrana Dall, 1916. " Boca de Quadra, Alaska, and south to Coronado Islands, Lower California" (Dall, 1921). Type locality, Point Conception, Calif. in 284 fathoms.

Comment, Minutes #25, p.21 " After examining topotypes of Macoma planiuscula Grant and Gale, 1931, Mr. George Willett believes that what we have been calling M. planiuscula is really M. quadrana Dall, 1916.

Collecting data: Dredged off Redondo Beach, Calif. in 75 fms. mud bottom (Burch); Ketchikan and Craig, Alaska, 25-50 fms. (G. Willett); Victoria, B.C. in 5 fms. (Lewis); Olga, Wash. (Engberg); Skidegate, Queen Charlotte Islands (Eyerdam).

Macoma planiuscula Grant and Gale, 1931. (Catalogue Marine Pliocene and Pleistocene Mollusca of California, Mem. San Diego Soc. Nat. Hist. vol.1, p. 372, pl. 14, figs. 11a & 11b, pl.20, figs. 8a & 8b). Range: Arctic Ocean to Puget Sound. (Dall, 1921 as carlottensis). Type locality, Nunivak Island, Alaska, Recent.

Comment, Minutes #25, p. 21 " See comment under M. quadrana. This species probably does not occur in California. According to Grant and Gale, Dall confused M. carlottensis with an undescribed species which they named M. planiuscula. Therefore, all references by Dall to M. carlottensis are in reality to M. planiuscula."

Mr. George Willett makes the following comment here " I doubt all records except Nunivak Island."

Macoma carlottensis (Whiteaves), 1880. " Arctic Ocean and south to Ballenas Lagoon, Lower Calif." (Dall, 1921 for M. inflatula). Type locality, Virago Sound, Queen Charlotte Island, British Columbia.

Comment, Minutes #25, p. 21 " Since Dall confused M. carlottensis with what is now M. planiuscula he redescribed M. carlottensis as M. inflatula. Therefore, M. inflatula is synonymous with M. carlottensis. This is an inflated subtriangular form which is distinct from all other west coast Macomas.

Collecting data: Dredged common off Redondo Beach, Calif. 1938-41 in 50-75 fms. mud bottom (Burch); Ketchikan, Craig, Dall Id., Alaska (Willett); in 30-50 fms.; Victoria, B.C. in 5 fms. (Lewis); Akutan Id., Aleutians (Norberg) (Eyerdam).

Macoma liotricha Dall, 1897. " Aleutian Islands and eastward to the Shumagin Islands, Alaska," (Dall). Type locality: Dr. A. Myra Keen advises " The type locality of M. liotricha is Atka Island, Aleutians according to the holotype label".

" A thin oval shell, with glossy yellow periostracum" (Dall, 1900).

Macoma expansa Carpenter, 1864. " Puget Sound to La Jolla, Calif." (Dall). Type locality, Puget Sound.

" This must be regarded as a doubtful species. The two specimens upon which it was founded belong to different species and neither agrees with Carpenter's diagnosis. A large broken valve with the teeth wanting probably belongs to the preceding species. The originally more perfect pair has also met with accidents, and is really too young for satisfactory determination. Specimens from Baulinas Bay, California, collected by Stearns, which have been associated with the specimens named by Carpenter, may belong to a valid species which will carry the name." (Dall,1900).

Macoma yoldiformis Carpenter, 1864. " Fuca Strait to San Diego, Calif." (Dall) Type locality, Neah Bay, Washington.

Comment, Minutes #25, p. 22 " .. cannot be confused with any other species. They are found occasionally in our bays, but live in shallow water along the coast." " A very uniform, brilliantly polished species" (Dall).

Collecting data: Santa Monica, Calif. 5 fms. 12/1935; Anaheim Bay(dead), 3/1936; Morro Bay, 2/1937 by shore screening; Monterey, Calif. 8/1937 in 10 fms. and 25 fms. and 8/1940 in 25 fms. shale and mud; Redondo Beach, Calif . 1937-41 in 15-25 fms. gravel and sand, common. (Burch); Dall Island, Alaska in 15 fms. (G. Willett); washed in on Terminal Island, 1918 (Chace); Vancouver, B.C., sandy beach,1931 (W.J. Eyerdam);Mission Bay(W.K. Emerson)

Macoma truncaria Dall, 1916. " Island near Cape Halkett, Arctic Ocean" (Dall)

This species is mentioned here because Dall listed it in Bulletin 112. However, it has never been reported from the west coast and is apparently of the Arctic fauna and should be omitted from west coast faunal lists.

Macoma alaskana Dall, 1900. " Lituya Bay to Gulf of Georgia" (Dall, 1921). Type locality, Lituya Bay, Alaska.

Comment, Minutes #25, p.22 " This species looks externally like an Angulus (subgenus of Tellina) but has the hinge of a Macoma. Lives on sandy bottom, coarse, perhaps with rocks".

Collecting data: Forrester Island, Alaska in 50 fms., Ketchikan, Alaska and Craig, Alaska in 20-30 fms. (G. Willett); Izhut Bay, Afognak Island, Alaska, 1922 (W.J. Eyerdam) (" apparently a very rare shell").

Subgenus Rexithaerus Conrad, 1869. Type (by subsequent designation, Dall, 1900), Macoma secta Conrad.

" Shell large, inequivalve, with a smooth surface, a large and strong deep-set ligament, behind which the dorsal margin is conspicuously produced upward" (Dall, 1900).

Macoma (Rexithaerus) indentata Carpenter, 1864. " Puget Sound to Lower Calif." (Dall,1921). Type locality, San Pedro, Calif.

Comment, Minutes #25, p. 23 " Like a young M. secta but beaked, indented and ventrally produced (Carpenter). As very large M. secta have a slight indentation, one might confuse this species with M. indentata. If specimens the same size are compared, however, the difference is apparent. A small M. secta is very much rounder and does not have any trace of the indentation that the very large specimens show. This species usually lives buried in sandy mud or sand in bays but is found in deeper water."

Collecting data: Off Redondo Beach in 25 fms. gravel 1938-41, Playa del Rey lagoon 12/1936; Morro Bay, Calif. 1/1937; very common; Surf, Calif. common on beach; off Monterey, Calif. 8/1940 in 20 fms. on shale; Estero de Punta Banda, Mexico 11/1937 (Burch).

Macoma (Rexithaerus) indentata tenuirostris Dall, 1900. " San Pedro and Santa Barbara Islands to San Diego(Kelsey) (Dall, 1921). Type locality, San Pedro, Calif.

" Differs from M. indentata in being more elongated, with a shorter and more pointed end and a deeper flexure" (Dall, 1900).

Mr. George Willett comments on this as follows " I doubt this as a race; individual or sexual variant?"

Collecting data: Dredged off Redondo Beach, Calif. 8/1939 in 25 fms. gravel, in 50-75 fms. mud and gravel 7/1938, also taken washed in on Terminal Island (Burch).

Macoma (Rexithaerus) secta (Conrad), 1869. " Vancouver Island and south to the Gulf of California" (Dall, 1921). Type locality, San Diego. Japan? Dall.

Comment, Minutes #25, p. 23 " We have never found specimensas large as those which wash up on the beach between Seal Beach and Huntington Beach. These large specimens probably live near the outer edge of the surf on the surface of the sand. Specimens from Seattle sent us by Eyerdam have the left convex valve badly eroded. This valve looks more like a part of the shell substance has been dissolved, then eroded by sand. If this is true it would indicate that the left side is up and the flat right side is kept down."

All collectors observe the great difference between specimens of this species taken from the sloughs or bays and those from the open sea. This bay race has been thought by some to be worthy of a subspecific name. However, they are obviously the same species and the differences in all probability merely caused by the habitat. Mr. A.M. Strong advises on this point (Per. Comm. Dec. 1944) " The typical variety is the large shell washed in on the sand beaches. Dall identified a smaller shell from the Mugu lagoon as a variety. He stated that the typical variety lives in the open sea and in general is more northern in its distribution. The small variety is more southern in its distribution and is usually found in more protected waters such as bays".

In the discussion of this species John Q. Burch made the following note " Dr. Dall placed the Japan? in the range of this species. We have a set from the Frederick Stearns collection of Japanese Shells labelled Sakai,Inland Sea, Japan. This set was sent us by Dr. W.J. Clench. It is obvious though that these shells are of a quite different species than anything found in local waters. If this is the species on which the Japan record was based, then we can erase the Japanese connection with this species." But it seems that Dr. A. Myra Keen had commented on the same matter before " The species of Macoma from Japan identified as secta is clearly distinct and should be named as new by some enterprising person, as I pointed out in a paper published in 1940."

Collecting data: Our experience has been to find this too common a species to record in all bays and on all beaches from Morro to Ensenada,Mex. The bathymetric range in our experience takes it down as deep as 25 fms. off Redondo Beach (Burch); Tacoma, Wash. (G. Willett); many localities on Puget Sound where it is often quite common on sandy mud beaches at low tide (W.J. Eyerdam).

Family SEMELIDAE

Genus Semele Schumacher, 1817. Type (by monotypy), Tellina reticulata Spengler -- Tellina proficua Pulteney.

" Shell rounded, subequilateral, beaks turned forward; posterior side slightly folded; hinge teeth 2.2, laterals elongated, distinct in the right valve; external ligament short, cartilage internal, long, oblique; pallial sinus deep, dounded" (Tryon. S.S. Conch.)

Semele decisa (Conrad), 1837. " San Pedro, Calif. to San Martin Island, Lower Calif. (Baker), Point Abrejos, Lower Calif. (Hemphill collection at Stanford). Type locality, San Diego, Calif.

Collecting data: In our experience the habitat of this species is in rocky rubble. We have taken it in abundance from the rubble reef off San Onofre, Calif., La Jolla, Calif. to Punta Banda, Lower Calif. in about the same type of shore (Burch); San Pedro, Calif. and Newport Bay (Willett); Newport Bay, Calif. and young at Point Vicente (Chace);Mission Bay(Emerson)

Semele flavescens Gould, 1851. Boston Soc. Nat. Hist., 4:392
" San Pedro, Calif. (in Oldroyd collection at Stanford University), to Callao, Peru (Jordan); Scammons Lagoon, Lower Calif., Mexico (in Hemphill collection at Stanford University) " (Grant and Gale, 1931). Type locality, San Diego, Calif.

We have this species from numerous localities in Lower California, San Felipe, Magdalena Bay etc. but have never seen a local specimen. It is, of course, possible that it might have been overlooked thinking it a juvenile decisa. Nevertheless we kept on the alert for it over a period of years. There seems to be no question about the fact that it has been taken on the California coast but it must be exceedingly rare here at the northern end of its range.

Semele striosa C.B. Adams, 1852. " Catalina Island, California to Panama" (Dall, 1921). Type locality, Panama.

Collecting data: Our experience has been to take one specimen of this species at Punta Banda across the bay from Ensenada, Mexico 12/1937. There is, therefore, no reason not to expect it occasionally as far north as Catalina Island (Burch).

Semele rupicola Dall, 1915. " Santa Cruz, California to Gulf of California" (Dall). Type locality, Santa Cruz, Calif.

Dr. Dall stated " This is Semele rupium of California authors, follow--ing Carpenter; not Sowerby, 1832". Some are still disposed to give this species Sowerby's name. Dr. A. Myra Keen advises on the matter ". Type locality of Semele rupium not given in original;holotype not as yet selected."

Collecting data: Our experience has been to find this species in Chama beds, Mytilus beds, and in rock crevices, especially worm tube covered rocks providing protected holes. Laguna Beach, common at La Jolla, Calif., San Onofre, and rather common below Ensenada, Mex. (Burch).

Semele rubropicta Dall, 1871. " Forrester Island, Alaska to Tia Juana, Mex. " (Dall, 1921). Type locality, Beach at Soquel, Monterey Bay, Calif.

This Tia Juana locality must refer to the beaches below Tia Juana because the city of Tia Juana proper is quite a drive inland.

There has been a great deal of discussion about whether or not this species represents one species, several species or several subspecies. Mr. A.M. Strong mentioned that at one time several years ago Dr. G.D. Hanna made a study of the variations of this species. A number of us have some puzzles indicating that a careful study of this species should be made by some competent student.

Collecting data: Our experience has been to find this a fairly deep water species. We have dredged it in great numbers off Redondo Beach from 25 fathoms to below 50 fathoms and never in shallow water. Our shallowest record for it is in 20 fathoms off Monterey, Calif. (Burch); Forrester Islandand Craig, Alaska in 25 fms.; San Pedro in 20 fms. (G. Willett).

Semele pacifica Dall, 1915. " Catalina Island, California to Acapulco"(Dall). Dr. A. Myra Keen advises " Type locality of S. pacifica is: U.S.B.F. Sta. 2022, off La Paz, in 21 fms."

There is rather a poor figure of this species given in Oldroyd. We have never seen a specimen said to have been taken off California. Mr. George Willett reports taking it in 20 fms. in Sta. Maria Bay, Lower Calif. Pilsbry and Lowe list it from Guaymas and San Juan del Sur. It must be a rare species.

Semele californica A. Adams, 1854. Proc. Zool. Soc. London for 1853(1854), p. 96. This species is not listed in Bulletin 112 not has it been reported by any member of the club. However, it is mentioned in " West Coast Shells " by Keep and Baily, 1935 with the note " occasionally found near San Diego though their true home is in Mexican waters". The original description is not to be found in Oldroyd and therefore we are glad to have it as sent by Dr. A. Myra Keen as follows:

" S. testa oblongo-ovali,subaequilaterali, sordide pallide fusca, radiatum striata; transversim sulcata, liris elevatis, subcorrugatis, ornata, interstitiis creberrime longidutinaliter striatis;latere rotundato, postico subtruncato, valde flecuoso; intus lutescente, margine luteo. Hab. Gulf of California"

Semele incongrua Carpenter, 1864. " Monterey, Calif. to the Coronado Islands" (Dall, 1921). Type locality, Santa Barbara Islands (not Santa Barbara as given in Oldroyd) according to Dr. A. Myra Keen.

Collecting data: Our experience has been to find this species a dredged form but in somewhat shallower water than we found rubropicta and more often on sand bottom whereas rubropicta came up with gravel and rocks.

We have dredged it off Monterey in 20 fathoms on shale, off Avalon, Catalina Island in 25 fms., off Malaga Cove, Los Angeles Co. in 15 fms., off Redondo Beach, Calif. common in 15 to 25 fms. on sand bottom. We have sets from off South Coronado Island in 7-10 fms. collected by Dr. Fred Baker. This gives us sets from both extreme ends of the recorded range and they do seem to be a bit different. Arnold described a subspecies montereyi in 1903. Dall reported this living at Monterey and Arnold so reported it. Grant and Gale, 1931, claim that it is in the synonymy of the typical Recent although listing it fossil. I am disposed to think that the first guess was correct and that the Monterey shellsare sufficiently different from the more southern forms to warrant the subspecific name which follows. (Burch).

Semele incongrua montereyi Arnold, 1903. Mem. Calif. Acad. Sci. Vol.3, p. 166, pl. 15, figs. 3,3a (not 4,4a as labelled,1903. This was described by Arnold as a variety of S. pulchra, but the figure indicates incongrua.

" Shell small, oval, ventricose, thin; beaks quite posterior to middle of shell; anterior dorsal margin long, nearly straight; anterior extremity evenly curved; posterior end much shorter than anterior, evenly rounded; fold obsolete; cartilage-process deep, oblique; one prominent cardinal tooth in each valve; lateral teeth distinct; pallial sinus very large, rounded, expanded interiorly. Long. 23 mm; alt. 17.5 mm.; diam. 11.5mm".

Collecting data: " I have montereyi fossil, San Pedro but not recent" (G. Willett); off Monterey in 20 fms. ? (Burch).

Semele pulchra Sowerby, 1832. " Monterey, California to Ecuador" (Dall,1921). Type locality on advice of Dr. A. Myra Keen ".. was originally given as Sinu Caraccensis; in modern geographical terminology it is Bahia de Caraques, Ecuador."

Collecting data: We have taken this species in a variety of different habitats. In the lagoon as Point Mugu, Ventura Co. it was not uncommon while sifting the sand about 6 inches deep in connection with large numbers of Cryptomya californica 6/1935, and in about the same habitat in upper Newport Bay. We have also taken it from Bird Rock, San Diego county which is rocky and on the open coast. (Burch)

Genus Cumingia Sowerby, 1833. Type (by subsequent designation Gray, 1847), Cumingia lamellosa Sowerby.

" Shell transversely oval, equivalve, rounded in front, subrostrated and slightly gaping behind, small, thin, often irregular in form; hinge with a spoon shaped cartilage pit, and a small anterior cardinal tooth in each valve;

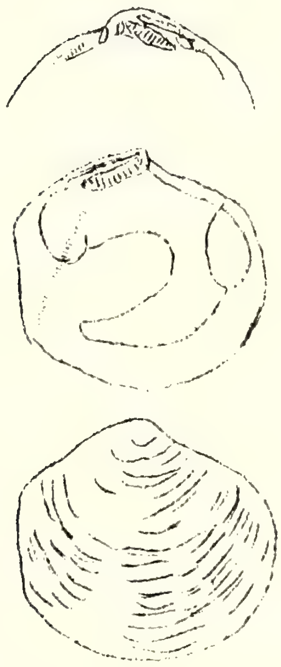
two elongate lateral teeth in the right valve, less developed in the left; beaks small; surface concentrically ridged; pallial sinus very wide. living in sponges, sand, and in the fissures of rocks" (Tryon S.S. Conch.)

Cumingia californica Conrad, 1837. (*Cumingia lamellosa* of authors not of Sowerby) Jour. Acad. Nat. Sci. Phila., vol.7, p. 234, pl. 17, fig.12.

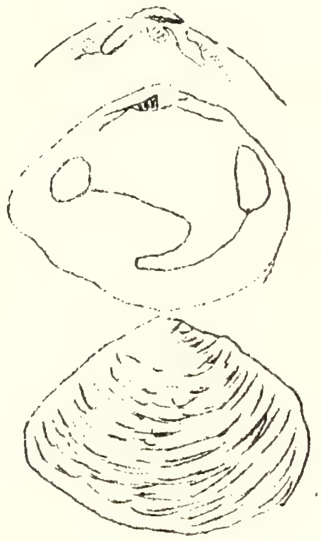
" Shell triangular, convex, thick, with numerous irregular lamellar concentric striae; posterior side compressed, cuneiform; beaks central, rather prominent; lateral teeth prominent. Length, one inch and one fourth." Type locality, Santa Barbara, Calif.

The range of this species is subject to great question due to confusion of identifications. Dr. A. Myra Keen in " Abridged Check List" gives 23-41 which would be from Cape San Lucas to Mendocino Co., Calif. However, we have the following advice on this species from Mr. A.M. Strong (Per. Comm. Dec. 1944) " There seems to be three species which Dall lumped under the name *Cumingia lamellosa* Sowerby as the sculpture and habitat seems to be the same. Our shell should be called *C. californica* Conrad. It is much the largest of the three and more elongate when not distorted. *C. lamellosa* is known to range from Panama south. It is only about a quarter the size of our shell and more triangular but not as triangular as *triangularis* which seems to have a middle range. Due to the mix up in the use of the names nothing is known about the limits of the ranges of the three."

Collecting data: This species is a nestler taken in rock crevices. Abundant in many wharf piles. We have collected it at many localities in r rocky rubble, Monterey, San Simeon, Cauyocos, Palos Verdes, San Pedro, Laguna Beach, south to Punta Banda, Lower California. It was not uncommon in dredgings from as deepas 20 fathoms in the shale off Monterey and in the gravel at 25 fathoms off Redondo Beach (Burch)



Semele



Cumingia

Family DONACIDAE
Genus Donax Linnaeus, 1758. Type (by subsequent designation, Anton, 1839), Donax rugosus Linnaeus (on advice of Dr. A. Myra Keen. Grant and Gale cite designations of Herrmannsen, 1847 and Gray 1847).
" Shell trigonal, wedge-like, closed; front produced, rounded; posterior side short, straight; margins usually crenulated; hinge teeth 2.2; laterals 1-1 in each valve; ligament external, prominent; pallial sinus deep, horizontal" (Tryon S.S. Conch.).

Santa Barbara, Calif.
Donax californica Conrad, 1837. " [illegible]) to Panama (Dall). Maxwell Smith in " Panamic Marine Shells" 1944 gives the range of californica south to Ecuador, but he places under it such forms as culter Hanley, and if my specimens are correctly identified culter is certainly another species.(Burch). Type locality, near Santa Barbara, Calif.

Collecting data: In our experience this species is a bay form. We have taken it in Alamitos Bay, Anaheim Bay just inside the entrance at Anaheim Landing, in upper Newport Bay, Mission Bay, and very common in the Estero below Ensenada, Mexico. We have never dredged it nor taken it from the open coast. (Burch).

Donax gouldii Dall, 1919. (Donax obesus Gould, Donax laevigatus Deshayes). " San Luis Obispo (Keen) to Acapulco, Mexico (Dall). Type locality, San Diego, Calif.

Collecting data: Our experience has been to find this a very abundant species with a preferred habitat on sandy beached along the open sea. Beds of them are common all around Santa Monica Bay including Redondo Beach. Nearly all sandy beaches from Long Beach to Ensenada, Mexico have colonies of this species. While it is a shallow water or littoral species we have brought it up with dredgings off Redondo Beach down to perhaps 15 fathoms. It was at one time of commercial importance below Long Beach being collected in quantities to make chowder.

Our Common Wedge Shell By Dr. W.O. Gregg

" As pointed out by Strong (Nautilus 37(3):81 and also by Grant and Gale (p. 380) it was first named and described by Gould as obesa(1851). The name was preoccupied by D. obesa d' Orbigny, 1846. Then came D. laevigata Deshayes, 1854, which was preoccupied by D. laevigata Gmelin, 1791. Since neither of the above names could be used, Dall uses the name Donax gouldii and refers in Bulletin 112 to Gould's description and figure of obesa. In the case of a preoccupied name the mere reference to the original description in connection with a proposed new name is sufficient to validate the new name. However, in Bulletin 112, p.49, the name gouldii is not designated as a new name but listed thus- Donax gouldii Dall, 1919, indicating that the name had been published in a 1919 article. Did such article ever appear or is the use of that date an "error" or just plain incorrect usage ? I have searched in vain to find any reference to the 1919 article. In connection with Dall's name, gouldii, Grant and Gale refer only to Bulletin 112, which would indicate that that was the first publication in which it had appeared. If any one knows of the 1919 reference he should not keep it a secret. Oldroyd gives Gould's original description and figures Gould's types. These clearly indicate that the shell which Gould described was the short obese form which almost entirely lacks the colored rays. This form is also illustrated in Johnson and Snook, p. 452, fig. 451. This typical form of D. gouldii appears in the collections of certain southern California collections under the name D. conradi, a much different shell which does not occur in our waters. There is a much more common form which is more elongate, less obese, and conspicuously marked by colored rays. We have been applying the name gouldii to this common form. Is this merely a differ-

-ent form which is influenced by a somewhat different ecology as is known to occur in the case of certain fresh-water bivalves suchas Gonidia angulata, or is this common form a distinct entity? The short obese form is of a more southern distribution. I have material from San Diego and Todos Santos Bay. I also have from both localities sets of the more common form. It would appear that all the more northern records of D. gouldii are based on the common form rather than on typical gouldii . Both forms occur in pure colonies. "

Editors Note: The two forms discussed by Dr. Gregg are so obvious that the beginner usually insists that he has two different species. It is my opinion that one of them should bear at least a subspecific name.

Donax punctatostriata Hanley, 1843. While this species is listed in Bulletin 112 by Dall as ranging from San Pedro south to Peru, it is certainly of the southern fauna and not of that of California. We shall, therefore, omit it from our California lists.

Donax conradi Deshayes, 1854. " San Diego, California to Central America" (Dall). Type locality, Gulf of California.

" Shell large, radially striate, somewhat like that of D. punctatostriatas Hanley, but more elongate. Length 27 mm., height 17 mm."

Several of our members have sets labelled with this specific name from Mission Bay and also from the Estero below Ensenada. However, those I have seen are obviously nothing like the above description. It is our opinion that this species is another of the southern fauna. We shall omit it from our California lists.

We note a paragraph from Dr. A. Myra Keen (Per. Comm. Dec. 1944)
" Donax conradi was first published by Reeve in Sept. 1854; Deshayes description did not appear until the following year. Our only specimens are from the Gulf of California". Mr. A.M. Strong advises " D. punctatostriata and D. conradi almost certainly do not belong in our fauna".

Family Garidae (Psammobiidae, Sanguinolariidae)

Genus Gari Schumacher, 1817 (Psammobia Lamarck, 1818) Type (by absolute tautonymy), Gari vulgaris Schumacher -- Tellina gari Spengler -- " Psammobia" caerulescens Lamarck fife Grant and Gale, 1931.

" Shell elongate ovate, generally rather thin, equivalve; hinge with one or two bifid teeth in each valve, part or all of one or more teeth sometimes being obsolete or much reduced; pallial sinus large; sculpture absent or of moderate strength, radial or concentric".

Subgenus Gobraeus Leach,1852. Type G. variabilis Leach -- Solen vespertinus Gmelin.

" This group has no circumscription of the dorsal areas,and differs from Psammobia most obviously in its blunt and inflated form, with a distinct posterior gape" (Dall, 1900).

Gari (Gobraeus) regularis(Carpenter), 1864. " San Diego, Calif. to Cape San Lucas" (Dall, 1921). Type locality, Cape San Lucas.

This seems to be a good species but must be exceedingly rare. It has never been reported by any member of the club.

Gari (Gobraeus) californica (Conrad), 1848. " Japan, Kamtchatka, the Aleutian Islands and south to San Diego, Calif. " (Dall, 1921). Type locality, California.

Collecting data: Our experience has been to find this a comparatively rare species. We have dredged it off Monterey in 20 fms. on the shale and also taken it from the Redondo Beach dredgings as deep as the 25 fathom gravel. Probably the best locality we know of to collect this species is the stretch of beach between Sea Beach and Huntington Beach. There is an off shore reef along there and after storms it is possible to pick up great

numbers of Gari californica, many of them perfect with the animals still alive. Theyare usually associated in this case with great numbers of several other species such as Amiantis callosa, Macoma secta, Saxidomus nuttalli, Mactra hemphilli etc. We have heard of members taking the species in the bays but have never been fortunate enough to take such a specimen in southern California" (Burch); Sitka and Craig, Alaska (George Willett)
Gari (Gobraeus) edentula (Gabb), 1869. " San Pedro and Catalina Island, to San Diego" (Dall, 1921). Type locality, Pliocene of San Fernando, Calif .

Collecting data: We have dredged this species off Redondo Beach, Calif always in comparatively shallow water, perhaps 15 fathoms. It has never been common in the dredgings although large dead valves often came up showing that the species was there but probably below our dredge cut. We have a finne pair or two taken by Mrs. W.H. Eshnaur on Terminal Island after the blows but collected some 30 years ago(Burch)

Genus Sanguinolaria Lamarck, 1799. Type (by monotypy), Solen sanguinolentus Gmelin.
Sanguinolaria s.s. " Shell moderately large, thin, equivalve, short, rose-colored or white, with short, inconspicuous nymphs, two bifid cardinal teeth in each valve; pallial sinus deep, widest in front, confluent with the pallial line below, the epidermis thin, dehiscent" (Dall, 1900).
Subgenus Nuttallia Dall, 1898. Type, S. nuttallii Conrad.

" Shell large, suborbicular, inequivalve, more or less twisted, the right valve slightly flatter, the posterior cardinal in the left valve obsolete; the pallial sinus narrower in front and somewhat detached from the pallial line" (Dall, 1900).

Sanguinolaria (Nuttallia) nuttallii Conrad, 1837. " San Pedro to Magdalena Bay, Lower Calif." (Dall, 1921). Dr. A. Myra Keen lists it from Monterey, Calif. collected by Mackenzie Gordon and also MacGinitie. Type locality, near San Diego, Calif.

Collecting data: While it is true that valves of this species wash in on the beaches occasionally from the open sea, our experience has been to find the species estuarine. We have spaded them up by the hundreds in such localities as the lagoon at Mugu, Ventura Co. , Anaheim Bay etc. We found the species as a rule about 6 to 8 inches below the surface of the sand, (Burch).

Genus Heterodonax Morch, 1853. Type, Tellina bimaculata Linnaeus, 1758.

" Shell rounded-triangular, smooth, rather solid; two lateral teeth in each valve" (Tryon S.S. Conch.).
Heterodonax bimaculata Linnaous, 1758. " Monterey, California to Panama. Also Atlantic" (Dall, 1921). Johnson gives the Atlantic range " Florida to Brazil".

Collecting data: Our experience has been to find this species a bay form and always at the very highest portion of a sandy shore very close to the high tide line. In such localities as the lagoon at Mugu, Ventura Co., this species may be taken by the thousands within few inches of the surface marking a definite stratum along the edge of the lagoon. A few feet, perhaps 8 or 10, nearer the water, below the stratum of the Heterodonax one comes to another strip in which Cryptomya californica is almost as common, although associated with several other genera such as Semele pulchra. The Heterodonax seem to be almost the entire fauna of their particular strip. Alamitos Bay is another bay in which this species seems to thrive under about the same conditions. We have sets from the West Indies and are unable to see the slightest difference between them. (Burch).

Genus Tagelus Gray, 1847. Type (by original designation), Solen guinensis Gray. " Beaks median or subposterior; teeth two in each valve, simple, pedunculate; valves without constriction or clavicle, straight; pallial sinus deep, reaching to or beyond the beaks; posterior adductor scar rounded ; pallial sinus with the ventral part partially coalescent with the pallial line; situs estuarine or marine" (Dall, 1900).

Tagelus californianus (Conrad), 1837. Monterey Bay, Calif. (MacGinitie 1935) to Gulf of Tehuantepec (Dall). Type locality, near Santa Barbara.

Collecting data: Our experience has been to find this a very common bay form. The habitat if from 8 to 12 inches below the surface of the sand in the intertidal zone of such bays as Anaheim, Alamitos, Newport, Mission, Estero below Ensenada etc. (Burch). " I have a growth series from 3 to 9 cm. long, taken alive in the Venice Canal a short distance from where I collected T. affinis (C.B. Adams). There is not the slightest suggestion of intergradation" (Dr. W.O. Gregg).

Tagelus affinis (C.B. Adams), 1852. " Santa Barbara, Calif. to Panama" (Dall, 1921). Type locality, Panama.

Collecting data: Of course, this species is so close to californianus that it could very easily be confused without careful study. When we first got them from Lower Calif. we started checking and looking. The result was to find a number of sets labelled affinis from California but they all proved to be californianus. The beaks of the species affinis are definitely behind the center of the shell when compared to californianus with its centrally located beaks. T. affinis is very rare at this end of its range. The only set known from local waters is a large set collected by Dr. W.O. Gregg in the Venice Canal near Playa del Rey, Calif.

Subgenus Mesopleura Conrad, 1837. Type, Solen divisus Spengler. " Shell with an internal radial rib, ventrally directed from the submedian beaks; ends of the valves rounded, and the form of the shell usually more or less arcuate; otherwise like Tagelus."

Note by John Q. Burch " I have just picked out a set of Tagelus divisus type of the subgenus Mesopleura and the internal rib is apparent. Then I picked out a few sets of our Tagelus subteres and perhaps with the assistance of immagination a vague rib could be noted on an occasional specimen but even then it would be preferable to take some else's word for it. In fact I see little of anything to encourage me in a division of our Tagelus into subgenera. Therefore until advised,I propose to ignore subgenera.

Tagelus subteres (Conrad), 1837. " Santa Barbara, Calif. to Panama" (Dall). Type locality, near Santa Barbara, Calif.

Collecting data: Almost identical habitat and localities as californianus , Mugu,Ventura Co., Anaheim Bay, Playa del Rey, Mission Bay, Estero below Ensenada etc. (Burch); " I have three or four specimens which show the internal rib; three or four specimens out of that many dozen examines." (Dr. W.O. Gregg).

Tagelus politus (Carpenter), 1857. Mazatlan Cat., 1857:27.

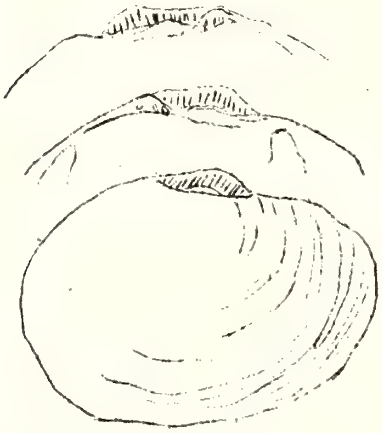
" S. t. forma "S. affini" simili, sed subtranslucida, violacea, extus linea fusca et lineis albicantibus nonnullis radiata; epidermide politissima , fusco-rubente: intus nymphis elongatis, denticulus 1-2 acutis, sinu palii versus umbones maxime arcuato; callositate ab umbonibus, linea fusca exteriore conveniente, subexpressa decurrente.

Known at once by the brownish violet colour, glossy epidermis, and dark ray corresponding with a slightly prominent ridge within. In this res-

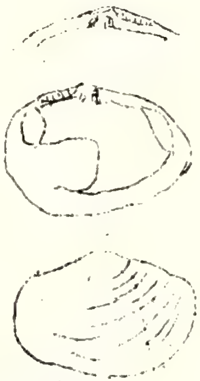
-pect alone it resembles Machaera. In the pallial sinus S. affinis is intermediate between politus and violascens; in colour S. violacens is intermediate: in the prolongation of the nymphae, S. politus. This species displays 2 small distinct muscular impressions between the umbo and the anterior adductor, which is oblong, but well defined: in S. violacens, it tapers off irregularly, uniting with these two: in S. affinis it is irregular, not tapering, uniting with the others which are also irregular. The largest specimen measures long. .48, lat. 1.45, alt. .23. "

The range of this species is something of a problem due to questionable identifications. However, Dr. Keen in " Abridged Check List" gives 8-34 which would be from about Santa Barbara south to Panama. Type locality, Mazatlan

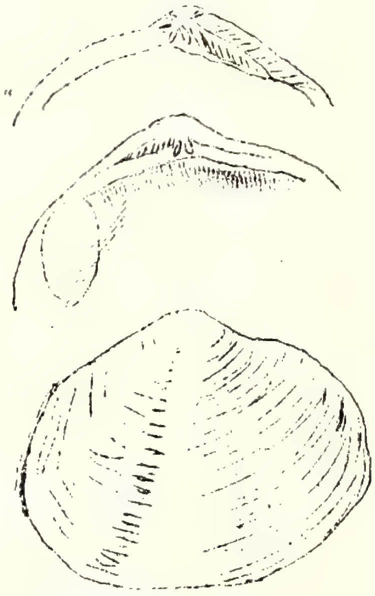
Collecting data: " Have specimens from Terminal Island so identified by Dall and a set from Magdalena Bay collected by Orcutt and so labelled. The Terminal Island shells were collected alive on the surface of the sand in the same manner as T. subteres is frequently found. They may be small, light colored specimens of T. californianus living in loose sand where a fixed burrow could not be made, but I am inclined to consider them distinct. Lowe had specimens of a quite different shell from further south which he checked up in the U.S. National Museum and decided were the true politus. As I remember it Dall stated that Carpentor based his species on fragmentary material and it was difficult to place it." (A.M. Strong)(Per. Comm. Dec. 1944); " We have Tagelus politus from Laguna Beach, collected by A.M. Strong. Dall reported it from San Pedro (Proc. Acad. Nat. Sci. Philadelphia for 1898, p. 59)" (Dr. A. Myra Keen); " See Maxwell Smith, Panamic Marine Shells, p. 64: " The late Dr. Fred Baker considered politus to be a young californianus". I have a set of Tagelus collected many years ago which A.M. Strong identified as politus. They match with specimens of the above mentioned growth series of T. californianus (Dr. W.O. Gregg);"I have 6 specimens from San Pedro, collected by Dr. Tremper, and named politus. They are much lighter colored than subteres, and somewhat darker than affinis. They have a central internal rib which appears to be lacking in affinis, and either lacking or indistinct in subteres."(George Willett).



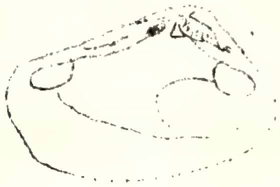
Sanguinolaria



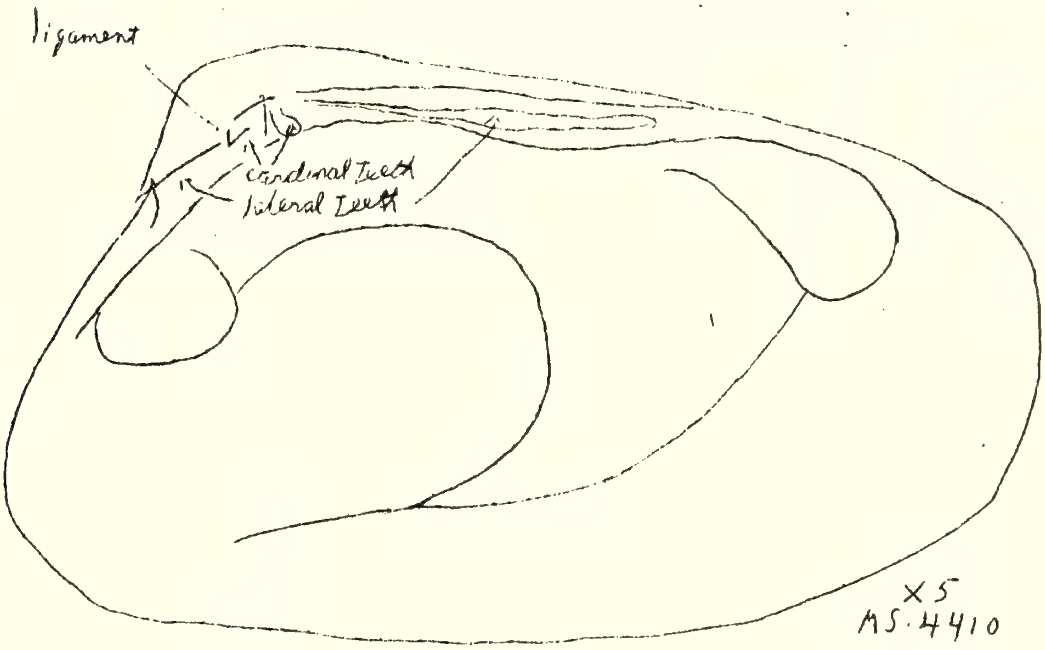
Heterodonax



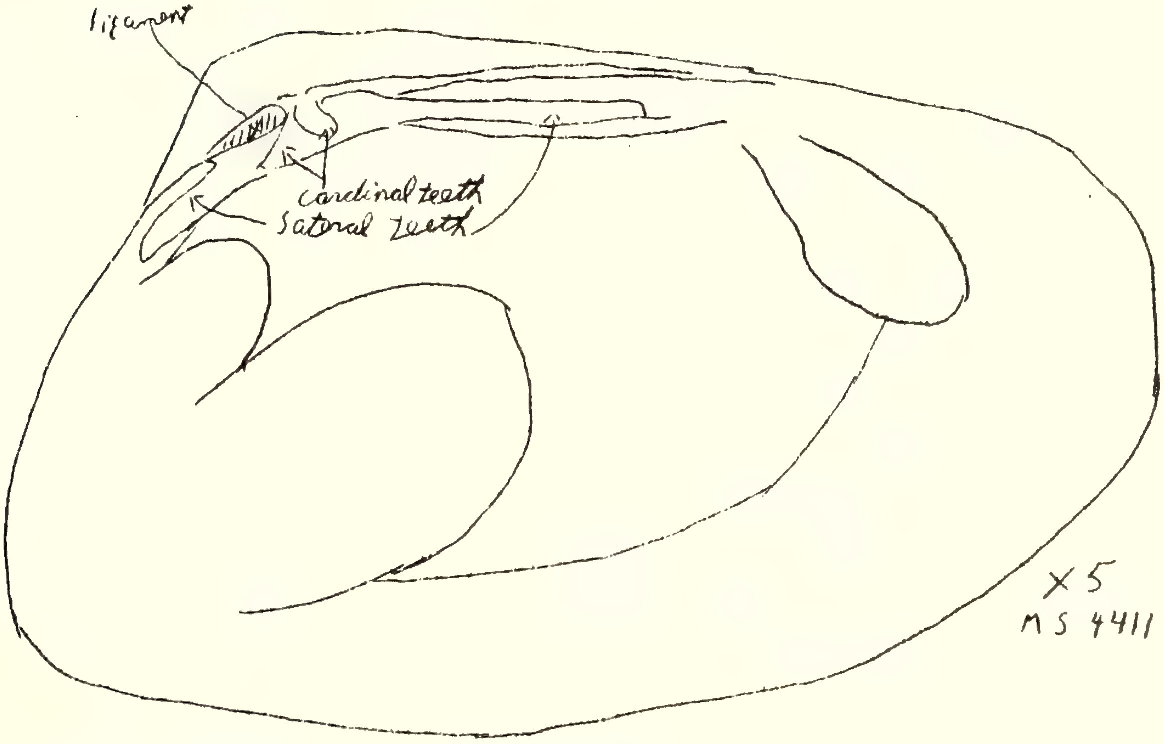
Apolymetis



Donax


ligament
cardinal teeth
lateral teeth
X5
MS·4410

Donax sp. San Diego Bay


ligament
cardinal teeth
Lateral teeth
X5
MS 4411

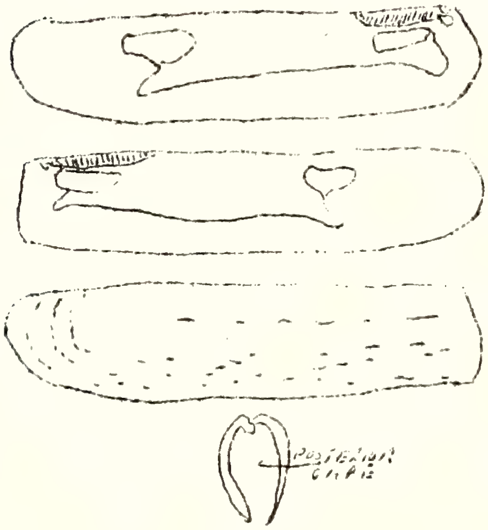
Donax gouldii Dall San Diego Bay

For discussion of the species figured above see pp 20-21 and the following page.

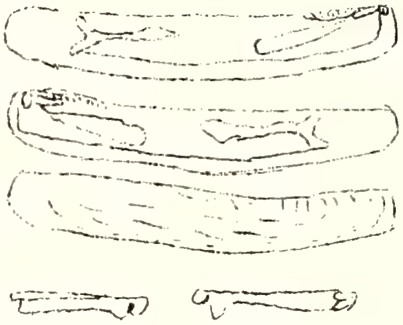
Editors Note- A typical specimen of the two species known as Donax gouldii Dall were handed Thomas A. Burch with a request that he make drawings of them. The figure MS 4410 is of the more common form with the colored rays. The figure MS 4411 is of the form described by Gould as D. obesa and renamed by Dall as Donax gouldii. The following comments by Thomas A. Burch are of particular interest under the circumstances.

" Just finished the drawings of the Donax. I have read nothing about these shells and tried to draw them just as they are. If the specimens you sent me are characteristic of the two lots I feel confident that they are distinct species as it is apparent from these drawings that not only is the shape of the two different, but also the hinge is definitely different.

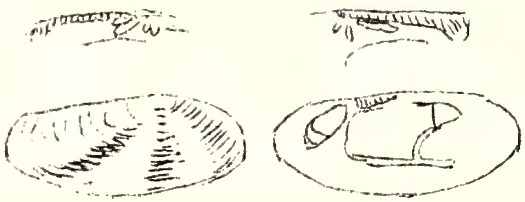
I did not bother to put in the serrations along the margin of the shells"



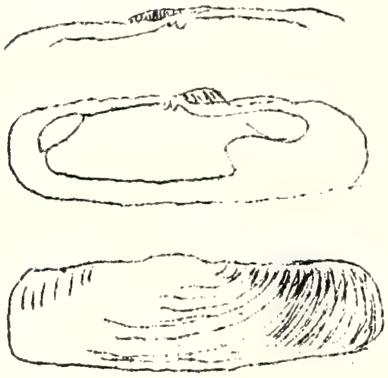
SOLEN



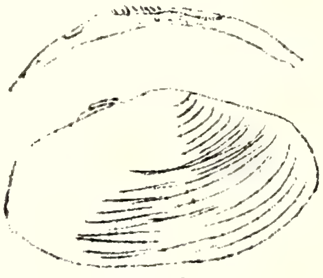
ENSIS



SILIQUA



TAGELUS



GARI

Family SOLENIDAE

Genus Solen Linnaeus, 1758. Type (by subsequent designation Children,1822), Solen vagina Linnaeus. Dall and other authors used Solen(L) Scopoli,1777 with type S. marginatus Pulteney. Dr. A. Myra Keen advises on this " Dall's usage is unacceptable. The type of a Linnaean genus must be a Linnaean species S. vagina Linne, an Indo-Pacific form usually known as S. brevis Gould, is the first species designated."

" Shell very long, subcylindrical, straight, margins parallel, ends gaping; umbos terminal, or subcentral; hinge teeth, one in each valve; ligament long, external; anterior muscle scar elongated, posterior oblong; pallial line extending beyond the adductors; sinus short and square."(Cottam and Godfrey).

Solen sicarius Gould,1850. " Vancouver Island to San Quintin, Lower Calif." (Dall). Type locality, Strait of Juan de Fuca. Well figured in Oldroyd.

Collecting data: Dredged off Monterey, Calif. in 10 to 20 fms. on shale, 8/1940; Alki Point, Seattle, Wash. 8/1936; off Redondo Beach, Calif. in 20--25 fms. gravel and sand 8/1937; off San Pedro, Calif. in 7 fms. 5/1938; taken littoral in Alamitos Bay 10/1940; common in the San Pedro Pleistocene (Burch); Mud Bay, Mason Co., 1900; Smith's Cove, Seattle, Wash., 1909 & Port Orchard, Kitsap Co., Wash; " This species lives on sandy mud flats at low tide mark or below. It does not seem to be common. I have only found it alive once" (W.J. Eyerdam).

Solen rosaceus Carpenter, 1864. " Santa Barbara, Calif. to the Gulf of California" (Dall). Type locality, Santa Barbara and San Pedro, Calif. (on advice of Dr. A.M. Keen). Dr. Keen also advises " The figure in Oldroyd is not rosaceus but is Ensis californicus."

Collecting data: Very abundant in Newport Bay, San Diego Bay and the Estero below Ensenada in our experience. Dredged as deep as 25 fms. off Redondo Beach, Calif. (Burch).

Genus Ensis Schumacher, 1817. Type, S. magnus Schumacher (fide Dall).

" Like Solen but with one right and two left vertical cardinals and in each valve a posterior horizontal tooth; the valves usually more or less curved" (Dall, 1900).

Ensis californicus Dall,1899. " Monterey, Calif. to Gulf of California"(Dall) Type locality, off the Island of San Pedro Martir, Gulf of Calif.

Note statement under rosaceus that the figure in Oldroyd of that species is a figure of Ensis californicus.

Collecting data: Our experience has been to find this species exceedingly rare. We have dredged great numbers withthe 25 fathom gravel off Redondo Beachbut by the very nature of the bottom and the dredgings it was a very low ratio of recovered complete specimens. The species is quite fragile. We have sets in our collection labelled as from San Pedro Bay and from Terminal Island collected by Mrs. W.H. Eshnaur and others in the years before the dredging of Deadman's Island etc. Some of the members have reported taking it in Newport Bay (Burch); specimens in the Los Angeles Museum from Long Beach collected by Mrs. Burton Williamson (Dr. H.R. Hill)

Genus Siliqua Megerle von Muhlfeld, 1811. Type, S. radiatus Linne (fide Dall, 1900). " Shell ovate, flattened, straight, with a rib or clavicle ventrally directed; hinge like Ensis, but more feeble" (Dall, 1900).

Siliqua lucida (Conrad), 1837. Bolinas Bay, Calif. (Clark, Nautilus 28, p.27) to Todos Santos Bay, Lower Calif. (Dall). Type locality, near Santa Barbara.

The problem with this species is to separate it from the young of Siliqua patula. This is particularly confusing to the collector who may as we have done at the mouth of Morro Bay, collect both species together. Grant and Gale, 1931 state, p. 390 " ... but lucida can be distinguished by its narrower and higher internal rib crossing the shell at right angles, by its shorter anterior extremity, by its blunter posterior extremity, and by its more arcuate ventral margin."

Collecting data: Taken littoral in the sand at low tide at the entrance to Morro Bay, San Luis Obispo Co., June, 1935; Avila, Calif. 5/1936; dredged off Monterey, Calif. in 20 fms.; off Santa Monica in 5 fms.; off Redondo Beach, Calif. in 15 to 25 fms.; and dredged off Ensenada in Todos Santos Bay in 15 fms.; taken littoral at Pacific Beach, San Diego Co. (Burch).

Siliqua media (Sowerby),1839. " Arctic Ocean and south to the Okhotsk Sea, Bering Sea, and eastward to Cook's Inlet, Alaska" (Dall, 1921).

This species has been the subject of rather extensive discussion. According to Grant and Gale, 1931, Dall erroneously attributed this species to Gray,1839. They furthermore place it in the synonymy of the species Siliqua alta stating " The form figured by Dall as media .., and Dall's description together with a specimen in the Oldroyd collection at Stanford University which was labelled by Dall in Washington, agree exactly with the young of S. alta. However, we have the following statement from Dr. A. Myra Keen (Personal Comm., Dec. 1944) " The type locality of Siliqua media was not given in the original. According to McQuillan, who made a special study of Siliqua on the West Coast, there are four recognizable species (See Weymouth and McQuillan, " Relative growth and mortality of the Pacific razor clam(Siliqua patula)..." Bull. Bureau of Fisheries, vol. 46, Bur. Fish. Doc. no. 1099 for 1930,1931, which may be obtained from the Superintendent of Documents, Washington, D.C. for 15 cents). To quote the above reference --" We consider that there are four species of Siliqua on the West Coast of North America; S. media,found in the Bering Sea and Arctic Ocean; S. alta in Cook Inlet and westward to Bering Sea and Siberia; S. patula from the Aleutian Islands to Pismo, Calif.; and S. lucida , from Monterey, Calif. to Lower California. All authorities agree that S. media and S. lucida are distinct species. The present view differs from that of Dall in two respects. S. patula nuttallii and typical S. patula , which he considers connected by gradations, we are unable to separate on reliable criteria and are forced, therefore, to deny to nuttallii even subspecific rank. S. patula alta , considered by Dall as a variety of S. patula, we find undoubtedly entitled to specific rank."..." The most notable character in S. alta is the pigmentation. All exposed parts of the mantle, siphon, and foot are colored by a chocolate-brown pigment which immediately distinguishes it from S. patula, which is entirely without this coloration."

Siliqua patula (Dixon), 1788. Arctic Ocean to Pismo, Calif.
Type locality, " Cook's River, northwest coast of America"

The discussion under S. media should be notes in connection with this species. Grant and Gale, 1931, p. 388 report " This species, well known as the edible razor clam, has been thoroughly studied by the Fish Commission. Thousands of specimens have been examined, their characters and habits analyzed,and the conclusion reached that the differences between the northern form (patula) and the southern form (nuttallii) are environmental , not genetic. Thus these two names must be considered absolutely synonymous . It is nevertheless worth while to note that the cold climate of the north causes the northerly individuals to grow more slowly, though they live longer and in the end attain a larger size, having a somewhat different, more weather beaten appearance than their southern brothers. On the other hand the form, alta , usually considered a variety of patula , is shown to be a dis-

-tinct and clearly recognizable species. It is distinguished by its greater proportionate altitude, increasing posteriorly, by its shorter anterior end, both of its ends being much blunter, and by the fact that the internal rib runs from the hinge nearly straight across the shell."

It is therefore, our opinion that Siliqua patula nuttallii (Conrad) should be placed in the synonymy of typical S. patula (Dixon).

Collecting data: Abundant on the beaches below Astoria, Oregon 8/1936; and common on the ocean side of the strand forming the seaward side of Morro Bay, San Luis Obispo County; S.E. Alaska to Aleutian Islands (Umnak) (G. Willett); Puget Sound (Trevor Kincaid); Cordova and Sitkalidak Id. and near Juneau, Alaska and Pacific Beach, Wash. (W.J. Eyerdam).

Siliqua alta (Broderip and Sowerby), 1829. " Arctic Ocean, south to Cook's Inlet, Alaska, and to the Okhotsk Sea" (Grant and Gale, 1931). Type locality Arctic Ocean.

Discussion of this species which was considered by Dall to be a subspecies of patula will be found above under S. media and S. patula.

Grant and Gale state that this species has a vertical internal rib whereas patula has a diagonal internal rib.

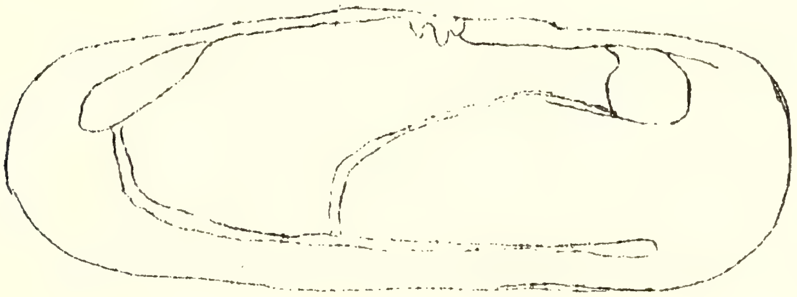
Collecting data: Mr. George Willett mentions the fact stated by Weymouth and McQuillan that the soft parts of alta are of a different color. Alaska Penninsula, Unalaska Island (G. Willett); Uyak Bay, Kodiak Island and Illulliak Bay, Unalaska Is. " This is a very distinct species and seems to be uncommon" (W.J. Eyerdam).

Tagelus

The following note by Thomas A. Burch is an explanation of his drawings MS 4414,4415,4416 on the following pages.

" After drawing the accompanying figures of T. californianus and T. subteres , I was at a loss to see any means of separating them without adding the violet color and characteristic epidermis to the drawings. I then looked in Grant and Gale and noted that T. subteres is in section Mesopleura which is distinguished from Tagelus in that the shell has an ' internal radial rib, ventrally directed'. I then reexamined my specimens and by using but a very slight amount of immagination this rib could be seen and felt with a pin. One young specimen, which incidentally was in with the T. californianus , had a very distinct internal ray, two had visible rays, but most (14) had but a slight thickening which could be felt but not easily seen.

Tagelus affinis is easily distinguished from the above by its stubbier shell and by the pallial sinus which extends anterior to the hinge."

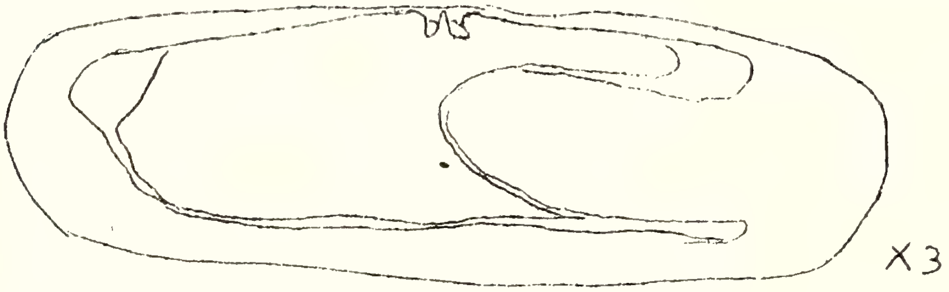


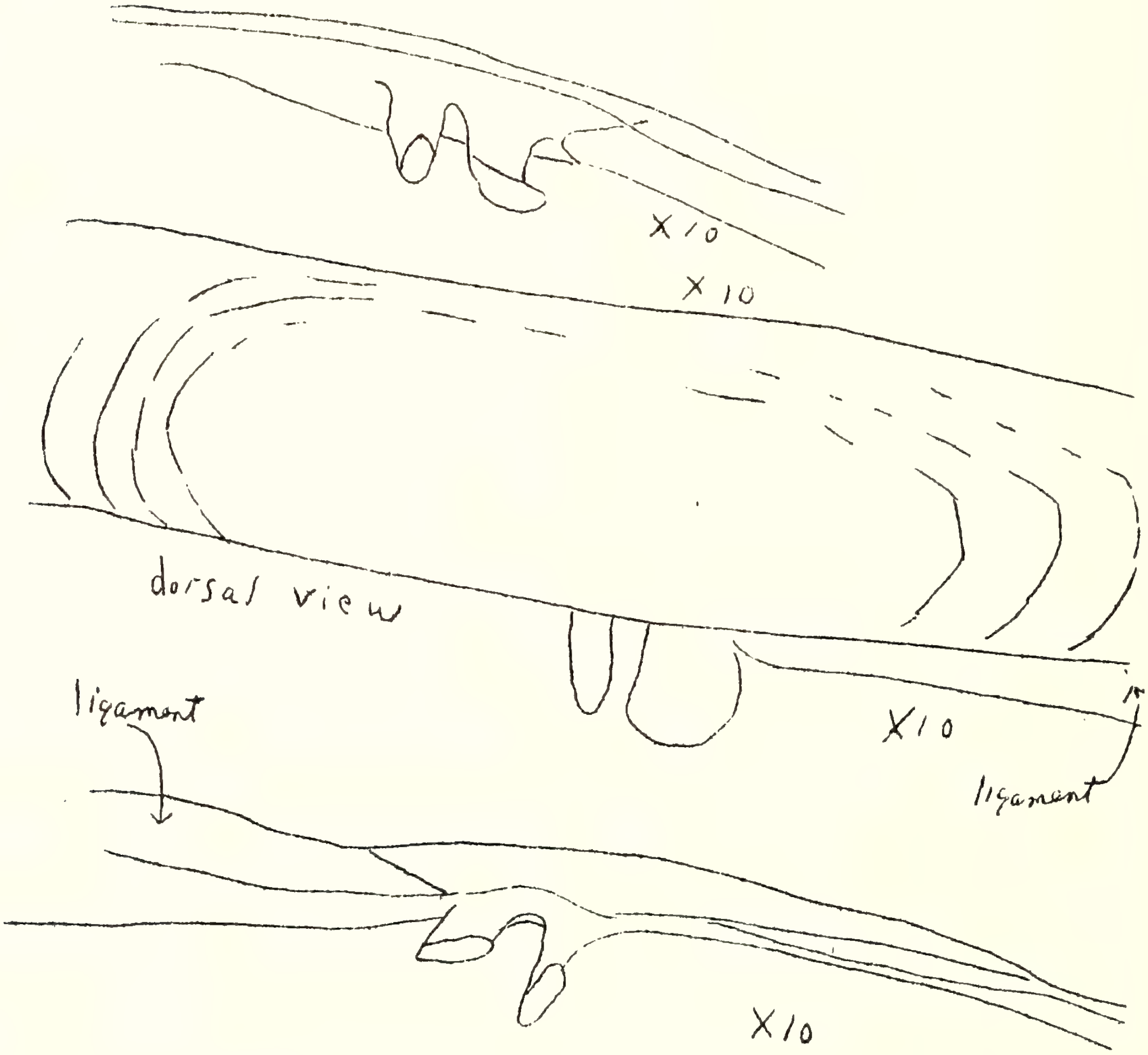
Tagelus affinis C.B. Adams, 1852 MS 4416
Almejas Bay, Lower Calif., Mex.

#43- p 30

Tagelus californianus (Conrad),1837. Mugu Bay,Calif. Mud flat,5/37
(Note* enlarged drawings not same specimen as smaller drawing).

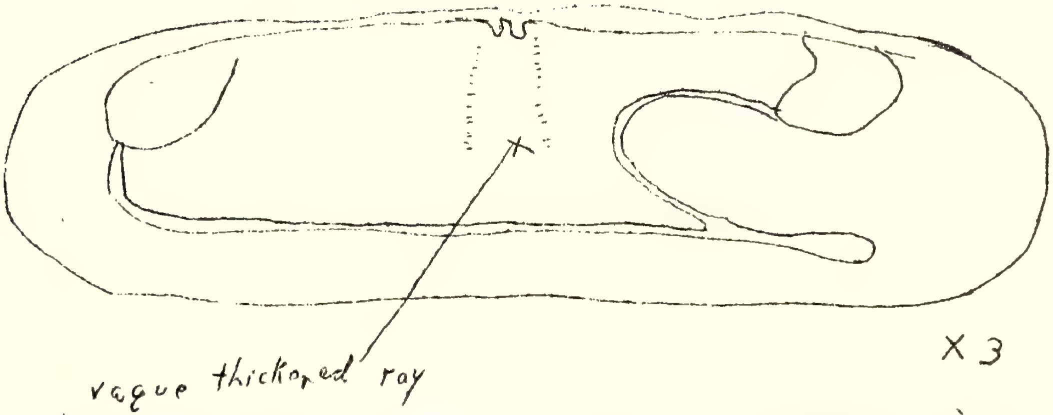
MS 4414




X 10
X 10
dorsal view
X10
ligament
ligament
X10

Tagelus subteres (Conrad),1837. Mugu Bay, Calif. Mud flat. 5/37

MS 4415



The following note by Thomas A. Burch is an explanation of his drawings of *Siliqua patula* and *Siliqua lucida* on the following two pages.

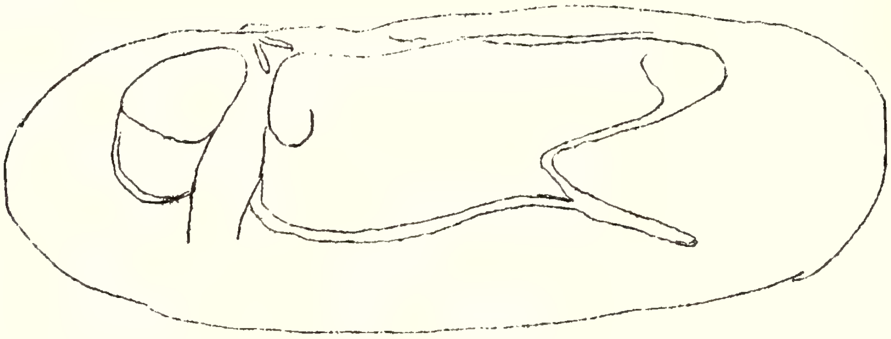
" Undoubtedly the easiest way to distinguish *Siliqua patula* and *Siliqua lucida* of the same size is by the angle that the thickened ray bears to the dorsal margin of the shell -- in *S. lucida* it is practically 90 degrees while in *S. patula* it is almost 45 degrees. In addition reference to the figures or specimens will show that while similar, the hinges in the two species are quite distinctive. Incidentally in Dixon's original description of *S. patula* as given in Oldroyd, if posterior is inserted instead of ' lateral' or ' side' in referring to teeth it makes sense-- otherwise it doesnt to me since there are no lateral teeth.

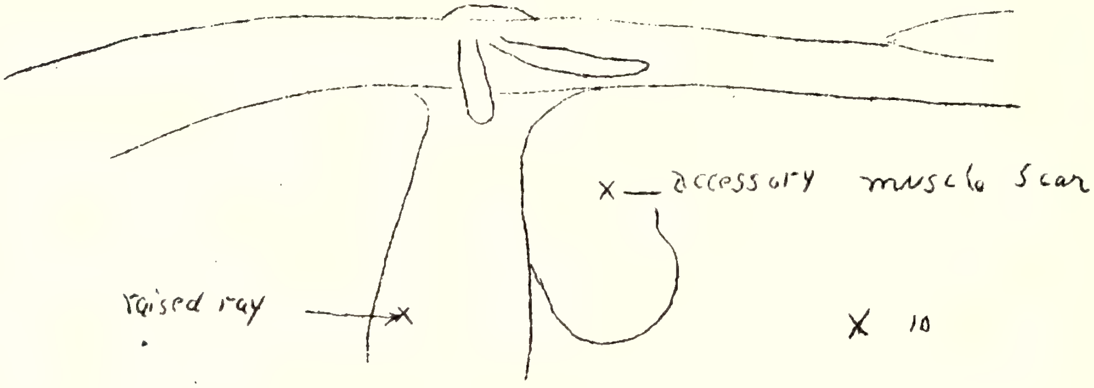
I have just looked at Keenand Frizzell's Key, Grant and Gale, and Oldroyd and in none of these do I find any mention of the fact that the thickened ray passing through, down from the hinge apparently divides the anterior adductor scar into two portions, thereby forming an accessory muscle scar. Another reference to the drawings shows that these muscle scars are a different size and shape in these two species, and hence may be used as a third criteria for identification."

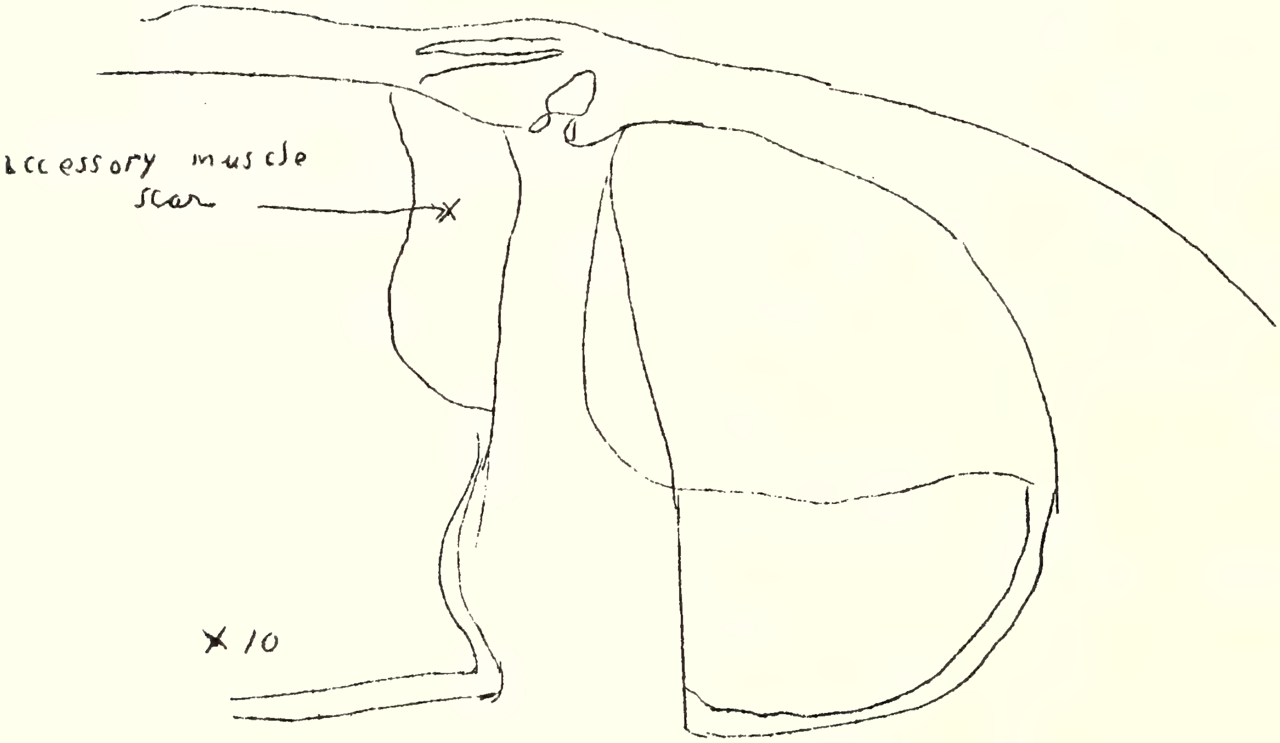
#43 p 32

Siliqua lucida (Conrad),1837. Santa Monica, Calif. 10 fms. 12/35

MS 4413



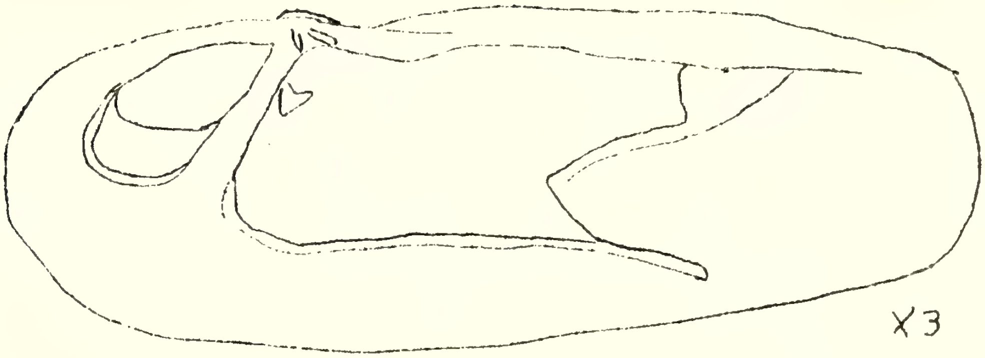

accessory muscle scar
raised ray
X 10

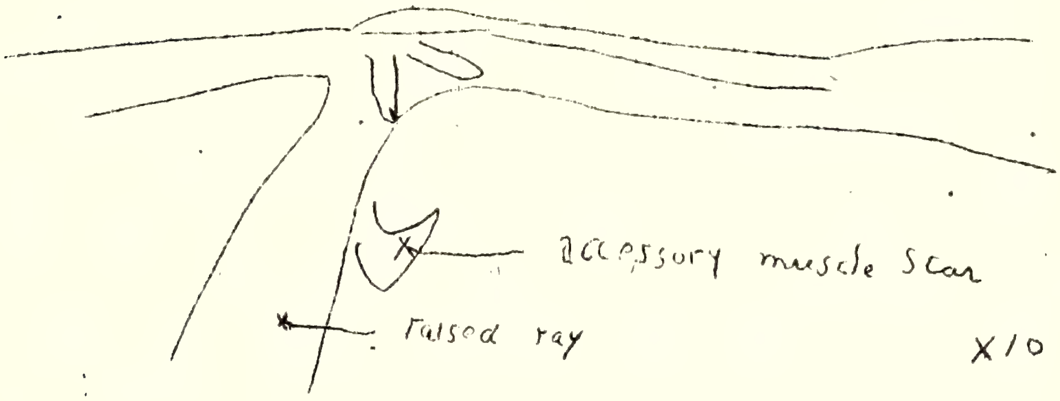

accessory muscle scar
X 10

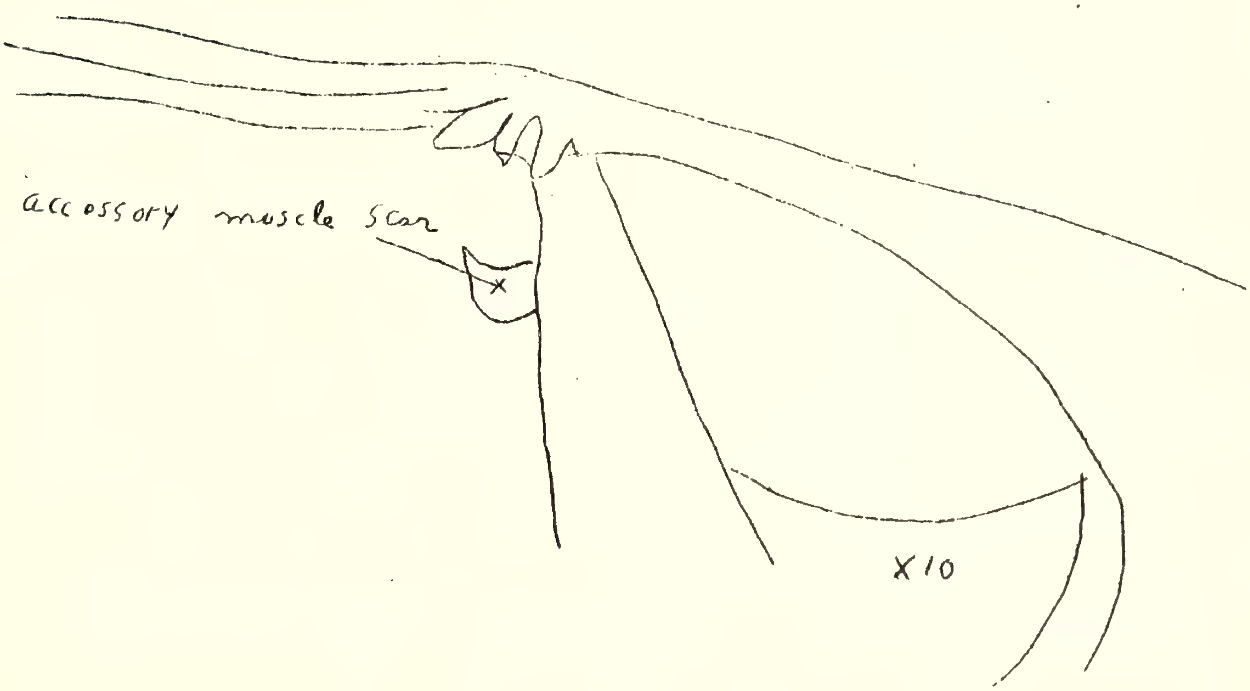
#43 p 33

Siliqua patula (Dixon), 1788. Morro Bay, Calif. Lit. Sand,1/1938

MS 4412




accessory muscle scar
Fused ray
X10


accessory muscle scar
X10

Corrections and Additions

Minutes # 42, p. 6 Dr. A. Myra Keen advises that " The type locality of Transennella tantilla (Gould) is Santa Barbara not Pliocene of Kettleman Hills.

Min. #42 p 6 Dosinia ponderosa Gray,1838. Records of the San Diego Museum- La Libertad, Son., Mex. 1935; Pts. Penasco, Sonora,1934; Angeles Bay,1932; Acapulco, Mex. 1930 in 20 fms. (Lowe); Guaymas,Sonora,1930; Carmen Id. 1932; Conception Bay, 1932; San Quintin Bay (Orcutt); Mazatlan, Mex.; Scammon's Lagoon, L.C. (Capt. Porter); fossil in San Diego Bay.

Min. #42 p 6- Tivela stultorum (Mawe),1823. Cambria, Calif., large (Wilcox); Turtle Bay, L.C. (Hemphill); Long Beach, Calif. (Lowe); Coronado Beach (Bristol); San Diego, Calif. medium and small (Hemphill and Baker).

Min. #42 p 6- Transennella tantilla (Gould),1852. San Francisco Bay (Button) Santa Barbara, Calif. (Button); San Pedro, Calif. and Puget Sound (Lowe).

Min. #42 p 7 Amiantis callosa (Conrad), 1837. Magdalena Bay, L.C. (Capt. Porter); Pta. Banda (Orcutt); Todos Santos Bay (Hemphill); Santa Maria Bay (Orcutt and Harrison); Coronado Beach; Anaheim Landing (Emery). We are also given an Orcutt record of this species from Santa Barbara, Calif. but this would be an extension of range northward 100 miles and should be checked.

Min. #42 p 7 Pitar newcombianus (Gabb), 1865. La Jolla, Calif. in kelp roots (Wilson); Catalina Island (Lowe); La Paz, L.C. (Capt. Porter); Magdalena Bay, L.C. in 10 fms. (Lowe, 1931); Manzanillo, Mexico in 20 fms. (Lowe); Conception Bay, in 15 fms. (Lowe); San Jose Id. (Lowe); La Paz, L.C. (Lowe); San Carlos Bay and Angeles Bay (Lowe, 1932). Note* This Manzanillo record by Lowe is an extension of range southward being on the mainland and perhaps 100 miles south of the mouth of the Gulf of Calif.

Min. # 42 p 8 Antigona fordi (Yates), 1890. Long Beach (Orcutt); Pt. Loma (Wilson); La Jolla, Calif. (Wilson); So. Coronado Id. (Capt. Porter); Catalina Island in 35 fms. and off San Pedro (Lowe); Pt. Vicente, Calif. (Chace).

Min. #42 p 8 Saxidomus nuttalli Conrad,1837. San Diego Bay (Bristol); San Diego (Hemphill); San Pedro and Santa Barbara (Lowe).

Saxidomus giganteus Deshayes,1839. Puget Sound and Sitka (Lowe); Fidalgo Id Wash. and Orcas Id., Puget Sound in 10-20 fms. (Baker); Idaho Inlet, Alaska (Stephens).

Min. # 42 p 11 Humilaria kennerleyi (Carpenter in Reeve), 1863. San Juan Island, Puget Sound (Oldroyd)

Compsomyax subdiaphana (Carpenter), 1864. San Pedro, 15-30 fms. (Lowe); Drakes Bay, Puget Sound (Oldroyd); Orcas Id. in 10-25 fms. (Baker & Oldroyd).

Min. # 42 p 13 Protothaca staminea petitii(Deshayes) Sitka, Alaska (Lowe). This record from the San Diego Mauseum is of particular interest. We would like to know exactly what Lowe identified as petitii. Species is questioneed.

Min. # 42 p 15 Liocyma viridis Dall, 1871. Kyasaka Harbor, 50 fms. (Lowe)

Min. #42 p 15 Irus lamellifer (Conrad), 1837. Ocean Beach, Calif. not common in clay (W.K. Emerson); Monterey, Calif. (Hemphill); Cambria (Hemphill); San Diego Bay and San Pedro (Lowe).

Min. # 42 p 16 Gemma gemma Totten,1834. San Diego Bay, 3 valves (Dr. Fred Baker); San Francisco Bay (Chaney);

Min. # 42 p 16 Psephidia lordi (Baird),1863. Catalina Island in 4 fms.(Lowe); Orcas Island, Puget Sound (Baker); Drier Bay, Knight Id. Alaska and Ellamar, Alaska (Baker).

Minutes of the November Meeting of the Long Beach Shell Club

The November meeting of the Long Beach Shell Club was held on Nov. 12 at the usual place, the childrens room of the Long Beach Public Library with President Ralph Bormann in the chair. There were 17 members and 2 guests present, illness and threatening weather keeping others away. In the absence of the regular secretary Mrs. E.P. Chace was appointed as substitute. There were no committee reports. Motions made and carried were: 1. That the Dec. meeting be held with Mr. and Mrs. Ulrich at 1049 Island Ave., Wilmington. 2. That Miss Rogers be thanked for her invitation to meet with her in Dec. Members were reminded to bring packages for the Christmas grab bag. President Bormann appointed these members to act as nominating committee to nominate officers for next year and report at the Dec. meeting, E.W. Ulrich, chairman, Mrs. Mary Bormann, and Miss Lena Higgins.

Program chairman Lindermann then introduced the speaker of the day, Professor G.E. MacGinitie who had taken as his topic " Feeding Habits of Pelecypoda". As the temporary secretary is not a court reporter and furthermore Prof. MacGinitie included some material which has not yet been published the following notes from his very interesting talk are far from complete.

Almost without exception pelecypods feed on microscopic material, plankton, single celled algae, spores of various algae which are given off at different times by different species but mostly around sunrise. In muddy conditions, and in deep water, the food is still microscopic but largely detritus which in this connection is decomposing plants. Only two plants, Zostera and Phyllospadix have gone back to the ocean. The most neglected place on any shore (from a scientific standpoint) is the stretch from the low tide line down to 50 feet. Bacteria are an important spurce of food. Caliyanassa lives on them almost entirely. In pelecypods the cilia create currents which move sheets or strings of mucus which trap the food. When a clam or mussel is feeding there will be four strings of food pouring into the mouth. In Schizothaerus any undesirable material is dropped down close to the front of the shell, then the clam seems to take a deep breath and expel the undesired in a little puff. Mytilus passes it right back in a U shaped current which takes it out close to the incurrent siphon. Anemones are green (in the shore species) because they have a single celled algae growing in their cells. Tridacna grows a sort of a garden in his own tissues like anemones. Tridacna has reversed its position in the shell as compared to other clams. Its foot comes out close to the hinge and the frilly lappets which hold the algae come out of the dorsal region, not the mantle edge. Tridacna has light diffusing lenses which increase the growing algae . Prof. MacGinitie supplemented his talk by passing around a paper which he has published on the " Feeding Habits of 4 Pelecypods" and a paper showing excellent pictures of Tridacnas on the Great Barrier Reef.

After Prof. MacGinitie's talk Mr. Ulrich reported that a beautiful specimen of ' Paper Nautilus' had recently been found on Cabrillo Beach.

Adjournment was after the usual manner.

Elsie M. Chace, Secretary Pro. Tem.

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It is impossible to express one's feelings at times. I have on my desk a Christmas card from our old friend W.H. Parris of Boom, Tenn. with this brief note" We lost our son in action, D. day".

Minutes of the Long Beach Shell Club- December Meeting

The Long Beach Shell Club held its regular meeting and annual Cristmas party, Dec. 10, at the home of Mr. and Mrs. E.W. Ulrich at 1049 Island Avenue, Wilmington, Calif. Due to illness many members were absent. 23 were present. Mr. and Mrs. Ulrich are noted for their hospitality and this occassion certainly added to their fame. The recently acquired Whitmore collection together with the choice specimens the Ulrich's already had collected were placed about the home for easy viewing. Then followed refreshments- the usual delectable sandwiches, candy, Christmas cakes and coffee and generous in amount.

Mr. Ralph Bormann, the president, called the meeting to order for a brief business meeting. The report of the nominating committee, Mrs. Ralph Bormann, Miss Lena Higgins, and Mr. E.W. Ulrich was given. For president, Mr. E.P. Baker, Vice-president and program chairman, Miss Julia Ellen Rogers, Secretary treasurer Miss Ruth Eaton, Chairman Courtesy Committee, Miss Grace Stillwell. They were unanimously elected.

Motion was made and carried that outside speakers be paid a flat rate of $2.00 to take care of their travelling expenses and incidentals. Motion was made and carried that this be made retroactive to include the visit of Dr. G.E. MacGinitie of Pasadena.

Miss Julia Ellen Rogers reported that Mrs. Abby H.C. Gorham had had a serious fall and was in the Community Hospital in Long Beach.

The subject of arranging for a permanent public exhibit in some prominent place came up for discussion. The president appointed Miss Julia Ellen Rogers, Mrs. Ralph Bormann, and Miss Lena Higgins members of a committee to investigate finding such a place.

After the adjournment the members entertained by telling tall tales. Some were very tall. Grace Stillwell, Secretary.

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The publication referred to in the Long Beach Shell Club minutes is: MacGinitie, G.E. " On the Method of Feeding of Four Pelecypods", Biological Bulletin, Vol. LXXX, No. 1, 18-25, February, 1941.

Professor MacGinitie is with the William G. Kerckhoff Marine Laboratory of the California Institute of Technology, Corona del Mar, California.

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Mr. E.P. Baker, 417 S. Downey Ave., Downey, Calif. We are shocked to hear of Ned's second recent injury. He has just recovered froma broken leg. The following note from Mrs. Baker." Ned has been in the hospital since Dec. 12 when he cut his left hand badly while using a power saw. He was in a critical condition for several days, is ever so much better now but so far as we know will have to spend Christmas in the hospital. He is having splendid care, the doctors and nurses are all so good to him, but of course, we both wish he could be home. Think perhaps Ned will be home the last of next week. Wish you could come to see us then. "

Paul P. McGinty and Sons, P.O. Box 345, Boynton Beach, Florida. We were happy to have a nice Christmas letter and card from the McGintys. They are all well. A little note about our friend Dr. Bales but we still dont know where Doc is collecting those borers at this moment. Dr. and Mrs. Bales spent a few days with the McGintys en route to the lower Florida Keys where they expect to spend the winter.

Mr. and Mrs. E.W. Boerstler, P.O. Box 494, 1010 Ocean Blvd., Corona del Mar Calif. Our friends have been doing some good collecting and have invited guests to join them. " Have been getting a few Cypraea these tides and most of them are the darkest I've ever seen. Almost black. We think very beautiful. I have never seen nicer ones than ours, all collected alive.

We just exchanged and I have a recent package from New Zealand which pleased me very much but I don't know what to do about sending in that direction. Doesnt seem the thing to do although I have them packed."

Major H.S. Mort, 13 Milner St., Mossman, N.S.W., Australia. Many thanks for the monthly copies of the minutes of the conchological club; as you see I am still in the hospital and look forward to their arrival each month. The following information may be of interest to Mr. W.P. Cook:- I have two specimens of Argonauta bottgeri, each about 1 3/4 inches maximum length. Both of these were picked up on the beach at Port Stephens, about 100 miles north of Sydney. Of course, neither had the animal in it, and of course a pelagic shell like Argonauta could drift for thousands of miles, so there is no knowing where it came from originally. I have not heard of it being found alive anywhere near Australia, so the Japanese locality may be correct. This does not answer Mr. Cook's query " Where can I get a bottgeri?" but may be of interest to him/...."

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Dr. Louis Brand, University of Cincinnati, Cincinnati 21, Ohio.
" Throughout the past year I have found your Minutes full of valuable and interesting information. Keep it up in 1945 and the years to come and more power to you. Your Minutes are not only good conchology, but the personal notes give them the breath of life. Enclosed is a small contribution to help along the good work.

During the past two years I have been collecting the f.w. bivalves of the Ohio, Licking and Little Miami Rivers in the vicinity of Cincinnati. As this is a classic locality for the Unionidae and old faunal lists are available, it may be of interest to your readers to see what the Ohio River still offers in spite of pollution so bad that the water is hardly potable even after extensive chemical and mechanical treatment. Some species once abundant are now apparently extinct. No Dysnomias at all were taken, alive or dead. Quadrula cylindrica, Cyprogenia irrorata, Obovaria retusa, Lampsilis fallaciosa, Lasmigona compressa are very rare-- indeed O. retusa was rare in Rafinesque's time, and he apparently failed to distinguish fallaciosa from his L. teres (anadontoides Lea). The collections were made upstream from Cincinnati and below New Richmond; at Cincinnati the river seems to be barreh. Anyone who wishes to collect our famous fluviatile mollusca, the largest and finest in the world,had better begin now. In a few years it may be too late. Even now some species are gone forever, for example the remarkable Dysnomia foliata,Hildreth , which exhibits sexual dimorphism to a greater extent than any known bivalve.

In the following list, species marked (L) or (M) were also taken in the Licking and Little Miami Rivers. These streams enter the Ohio at Cincinnati from the Kentucky and Ohio sides respectively.

Unionidae from the Ohio River (Coll. 1943-1944)
10-15 miles upstream from Cincinnati.

Actinonaias carinata Barnes (L)
Amblema costata Raf. (L.M.)
Cyclonaias tuberculata Raf. (L.)
Cyprogenia irrorata Lea (L.)
Elliptio crassidens Lamk.
Elliptio dilatatus Raf. (L.)
Fusconaia ebenus Lea
Fusconaia flava Raf. (L.M.)
Fusconaia undata Barnes (L.)
Lampsilis anadontoides Lea (L.)
Lampsilis fallaciosa Simpson (L.)
Lampsilis siliquoidea Barnes (L.M.)
Lampsilis ovata Say (L.M.)
Lampsilis ventricosa Barnes (L.M.)
Lasmigona complanata Barnes (L.M.)
Lasmigona compressa Lea
Lasmigona costata Raf. (L.M.)
Leptodea fragilis Raf. (L.)
Ligumia recta latissima Raf.
Megalonaias gigantea Raf. (L.M.)
Obliquaria reflexa Raf. (L.)
Obovaria olivaria Raf.
Obovaria retusa Raf.
Plagiola lineolata Raf. (L.)
Pleurobema cordatum Raf.
Plethobasus cyphyum Raf.
Proptera alata Say (L.M.)
Proptera laevissima Lea (L.M.)
Quadrula cylindrica Say
Quadrula metanevra Raf. (L.)

Quadrula nodulata Raf. (L.)
Quadrula quadrula Raf. (L.M.)
Quadrula pustulosa Lea (L.)
Strophitus rugosus Swainson (L.M.)
Tritogonia verrucosa Raf. (L.M.)
Truncilla donaciformis Lea (L.)
Truncilla truncata Raf. (L.)
Utterbackia imbecillis Say.

Additional species taken only in the Little Miami River.
Anodonta grandis Say
Anodontoides ferrusacianus Lea
Alasmidonta calceolus Lea

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Ledona Koppen, 1963 Waltonia Dr., Montrose, Calif. We have missed our members at recent meetings but were shocked to learn that it was due to a fall and serious injury involving confinement in the hospital for some seven weeks. We are, however, happy to report that she is well on the way to recovery and expects to rejoin us within a few months.

Mr. F.R. Aldrich, Aldrich Museum, Balboa, Calif. " I expect to be the Abalone King of Southern California. for as of this date I have stacked at my sons at Costa Mesa, over seven tons of fulgens and the corrugata. This is quite an exhibit in itself. I am doing some exchanging but nothing like it was in the past. The war did that.

Chester W. Melville, Fort Myers Beach, Florida. This is the winter address of the Melville family whose home address is 20 Hammondswood Road, Chestnut Hill, Mass. They expect to collect at Sanibel and the Florida west coast for the next three months. Good hunting.

Miss Mary Nimitz, 2914 Forest Ave., Berkeley, Calif. We are indeed happy to learn that the daughter of our great national hero, the Admiral, is a conchologist.

Lieutenant V.D.P. Spicer, 401 Vermont Ave., Berkeley, Calif. " My present adfress continues as above though my home and shell collection are "Twontroll Farm", Route 2, Box 237, Centralia, Wash. I do exchange when at home and can reach my store of duplicates, mostly polynesian marine species. My collection is worldwide marine in scope. Have been able to add a few new species and localities since return to active duty in the Navy with the war."

Mrs. H.P. Walker, Rt. 2, Box 242, Healdsburg, Calif. Mrs. Walker advises us that Julia Rogers Shell Book is out of print for the duration and only available on the used book market.

Professor Ralph W. Dexter, Dept. of Biology, Kent State University, Kent, Ohio. " I continue to enjoy reading your Minutes of the Conchological Club of Southern California and think you are doing a fine job. Best wishes for continued success."

Dr. Harald A. Rehder, Associate Curator, Division of Mollusks, U.S. National Museum, Washington 25, D.C. We are definitely flattered by a nod of approval from Dr. Rehder. " The last number of the Minutes of the Conchological Club of Southern California reached me a few days ago, and I have read it with much interest. It is becoming increasingly useful to workers in malacology, and I congratulate you for your considerable part in making it what it is."

Miss Miriam Shepard, Box 164, Route 2, Portland 10, Oregon. " I haven't been too well the past year, so I haven't done as much work as I should like. I hope to take one week of my vacation soon for a needed rest, and if I do I shall go to the beach."

Professor A.S. Duckworth, Southeast Missouri State Teachers College, Cape Girardeau, Missouri. Our friend seems to be having some fun with the microscopic species from certain small lots of deep water dredgings we had left about. What a pity he could not have been a member of our ' gang' when we were dredging. We literally paved a driveway at Redondo Beach with tons of such material from 50 to 250 fms.

MINUTES OF THE JANUARY MEETING OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIF.

The Conchological Club of Southern California met at the usual place and time Sunday, Jan. 16, 1945. The meeting was called to order by the president, George Willett and there were 16 members and two visitors present. The visitors were Arnold Kind, 1725 W. 41st Drive, Los Angeles 37 and John Q. Burch III. Arnold Kind expressed by card a desire to become one of our members and will henceforth be one of us. It is our understanding although he did not put it in writing that young Mr. Burch also expects to be one of our number. The membership committee reported that one of our members was again in the hospital, due to another accident. It would seem that he is getting a little more than his share of hard luck and all os us unite in hoping he may soon be with us again. It was good to have Mr. A.M. Strong back with us. He has been so much help in the past that we hardly know how to carry on without him.

Mr. Willett appointed the following committees for 1945--
Nomenclature- John Q. Burch, Elsie M. Chace, and Mr. A.M. Strong
Membership- Morris caruthers, Miss Edna Cook, and Mrs. Mary Cornett
Program Committee- Dr. H.R. Hill and Mr. E.P. Chace
Editor- John Q. Burch

In the discussion of study plans for the coming year all agreed on a wish to continue as we had been doing, our study of west coast shells that has proved to be of such absorbing interest to long-time collectors, but that we should add to this a bit of elementary work to make the meetings attractive to beginners, since so many of our younger members are now away at war.

The regular study was taken up and led by Mrs. Cornett and many knotty problems were encountered which will be reviewed elsewhere. Dues received $4.00, Amt. on hand $4.50.

***** Effie M. Clark, Secretary-Treasurer.

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Harking back to Minutes #38, Back Page on which we ran a quotation from the N.Y. Times regarding the giant snail of Malaya. Comments and data on this were received from several members and appeared in Min.#39.

Mr. J.R. le B. Tomlin has kindly sent us for examination a copy of the paper " Report on the outbreak of Achatina fulica" , E.E. Green, Circulars and Agricultural Journal of the Royal Botanic Gardens, Ceylon. And Mr. Tomlin comments " I note your paragraph about the giant snail in the Malay on the last page of Aug.-Sept. Minutes. How the chap has grown / Divide the N.Y. Times account by two and you'll have a more rational and correct picture. Of course, it is Achatina fulica , and I had it brought me from Singapore by Dr. Archer of Liverpool about 1894 or 1895 (the Voluta archeri man). "

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J.M. Dowdle, S 2/c, P.A.D. #3, Navy 167, c/o Fleet Post Office, San Francisco
Jack is still in New Guinea or was when this letter was written and I am a bit amazed at the speed of this letter. Jack dated it Jan. 2 and it is on my desk Jan. 9. Air mail of course. " Have just received two sets of Minutes dated Aug.,Sept. and Oct. respectively. You know, of course, that I am quite pleased to get them." "I will try to get you a Spondylus as you request; however I rather think that it has been described and you will find it to be S. ducalis Chemnitz." " I am happy to learn that Major Schenck is in New Guinea. If you can send me his A.P.O. number I will try to get in touch with him."

Jack says that he has mailed us ' considerable material' and we are eager and hopeful for its arrival. Needless to say that we will run a list of species received in these minutes.

Bert A. Gillham,Rockford, Iowa. " I am not doing much with shells the past few years. May have more time in the future. A friendand I have a collection of about 8,000 named varieties. Don't know if he is receiving your minutes or not. His address is H.H. Doolittle, 1925 B Ave., N.E., Cedar Rapids, Iowa.

Mr. J.R. le B. Tomlin, 23 Boscobel Road, St. Leonards-on-Sea, England.
" Just a line to wish you all that is good for Christmas and for 1945. I am enclosing the list of Terebra types that are to be found in the British Museum from Hawaii (Sandwich Islands in the paper of Deshayes referred to."

HAWAIIAN TYPES TEREBRA IN THE BRITISH MUSEUM

by J.R. le B. Tomlin

Terebra interlineata Deshayes. Pr. Zool. Soc. 1859, 227.
This is undoubtedly the same species as crenulata L. The unique type has stronger and more numerous axial tibs than ordinary crenulata L. probably owing to a very bad mend on the 15th whorl.

Terebra gouldi Deshayes. Journ. de Conch. VI, 89, pl.5, fig.2,1857, Type in British Museum.

Terebra bipartita Deshayes. P.Z.S. 1859, 284. The unique type in the British Museum is a small variety of casta Hinds.

Terebra bacillus Deshayes. ibid. ,285. Type (5).

Terebra inconstans Hinds. P.Z.S. 1843, 156: Thes. Conch. I,179, pl.44, fig. 83. Types (6).

Terebra nodularis Deshayes. P.Z.S. 1859., 295. Types (3).

Terebra flavescens Deshayes. P.Z.S. 1859, 299. Type (1).

Terebra swainsoni Deshayes. ibid. 299. Type (1).

Terebra flava Gray. P.Z.S. 1834,60: Thes. Conch. I, 177, pl. 44, fig. 75. Described without locality, the type being labelled " from an old collection". The holotype of T. peasii Deshayes, described from Hawaii - in P.Z.S. 1859, 302 is identical with flava.

Terebra varicosa Hinds. P.Z.S. 1843, 152. Gulf of Papagayo, west coast of Central America, in Thes. Conch. I, 163, a text figure is given. In the British Museum are two with label in Hind's writing, one presented by Belcher. This species is identical with larvaeformis Hinds.

Terebra variegata Gray. P.Z.S. 1834,61. No locality given. Type (1). Hinds in Thes. Conch. I, 173 says that Cuming dredged it at " Guaymas, Gulf of California". Terebra africana Gray, Types (2) in the British Museum is a synonym.

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Morris K. Jacobson, 455 B. 139 St., Rockaway, N.Y. " Some time ago I received a fine shipment of fossil material from the Calvert formation in Maryland. I washed out a lot of small and microscopic material, but find I know of no available published material to aid in identification. Know of any ? Should also like to obtain some fossils from your region. Know how I can get some, purchase or exchange ? "

The editor trusts that some of our local fossil hunters will take care of Mr. Jacobson. And it is also hoped that anyone knowing of the desired publications on the Maryland formation will drop him a note of advice.

Mrs. R.B. Lundy, 620 El Camino Ave., N. Sacramento, Calif. Mrs. Cornett has advised us that Mrs. Lundy is making a very fine west coast collection.

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New Publication- We have as yet not received our copy of the recently published check list of Tertiary mollusks by Keen and Bantson. No doubt our members interested in these species will wish to order a copy. Copies may be obtained for $1.85 from the Geological Society of America, 419 W. 117th St., New York 27, N.Y. The title is Special Paper No. 56.

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For years many of us have found difficulty in finding publications of the Biological Society of Washington. References to the proceedings of this institution are frequently encountered. The problem has then been to find it. For this reason we are very glad to have the following letter and to learn that these papers are available at the University of California.

We have a letter from Mrs. Robert S. Bray, Acting Corresponding Secretary, Library of Congress, Washington, D.C.- Biological Society of Washington.

" Your letter in regard to price lists of separates dealing with conchology has been forwarded to me. I a m very sorry to say that we do not have such an index available. However, the Library of the University of California in Los Angeles is a subscribing institution to the Proceedings of the Biological Society of Washington. I am sure that if you would consult the yearly index which is with each year or volume of the proceedings, you would find papers of interest to your group.

If you find that you desire certain proceedings and will send me the volume and page numbers, I shall be glad to quote you prices. We have a fairly good supply of papers published for the past thirty years and a limited number of those previously printed."

It will be sincerely appreciated if some student having access to these proceedings will take the time and effort to check through them a nd send this editor a list of references to papers dealing with conchology. This may be an opportunity to fill in a great many gaps in our libraries.

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New Publication

Catalog of North American Early Tertiary Fossils of the Gulf and Atlantic Coastal Plain- Published by the Bureau of Economic Geology- The University of Texas- Austin, Texas. Edited by H.B. Stenzel

This catalog is prepared in a manner similar to the " Catalog of North American Devonian Fossils" published by the Wagner Free Institute of Science in Philadelphia. The Early Tertiary catalog will contain descriptions and illustrations of the fossil invertebrates from the Paleocene,Eocene, and Oligocene of the Atlantic and Gulf Coastal Plain of the United States. Each species will be described and illustrated on a card of heavy paper 8½ by 11 inches in size, fitting a letter file. The text of the cards will be printed; the figures will be printed by full-tone process. Type specimens will be figured if available; if not, photographs of topotypes will be used wherever feasible. Photographs of topotypes will be used extensively as supplementary illustrations. Original descriptions will be quoted in every case. Additional remarks or complete redescriptions will be given if necessary. Type localities and stratigraphic data have been checked in the field by specialists in nearly all cases and will be given explicitly and in an up-to-date manner. Therefore, the cards will contain much more information than is available in the literature today. There will be running numbers for the whole catalog, one for each card. These numbers will begin with 1 and continue as long as new catalog cards are being published. Also, there will be running numbers restricted to each class. Sets now ready for distribution: Tectabranchiate Cephalopoda (Nautiloidea), 43 cards; Gastropoda-Genera Cryptochorda and Laparia, 12 cards; Gastropoda- Family Turritellidae, 81 cards; Brachiopoda, 28 cards. Complete set of 164 cards. set (sets) at $5.90 per set.

*** H.B. Stenzel, Geologist, Bureau of Economic Geology, Austin, Texas.

" At present I am working on Ostrea,Lopha, etc. (family Ostreidae). Perhaps some of the members of your club would like to send me some of the species which they have available, such as Ostrea lurida, O. gigas, etc. In return they might want some of the fossil shells of this region. I am sending by separate mail a box full of them and hope you will not mind acting as agent .

MINUTES OF THE LONG BEACH SHELL CLUB- January Meeting

The Long Beach Shell Club, meeting at 2:30 P.M., Jan. 14, 1945, was called to order by Mr. Bormann in the absence of both president and vice-president. Mr. Baker has had another accident and is in the General Hospital, Ward 3700, and Miss Rogers was unable to attend. Thirteen members were present. A letter of appreciation from Mrs. Linderman and the Barnetts for the flowers sent their mother was read. Mrs. Brewitt , City Librarian, sent word that no exhibit cases are allowed in entrance hallways due to fire regulations, but that our club may take turns with other organizations in the use of the hall cases. Mrs. Mary Green and Mrs. Jean Wilkins will represent the Agassiz Club in preparing such display.

Mr. Ulrich, introduced by Mr. Bormann, took as his subject the pearly and paper Nautilus. The early Nautilus, of the Paleozoic era, was a twenty foot tapering shell which later evolved a curve. But during one stage in its evolution, the curves were entirely disconnected. This branch of the group was illustrated by a box of beautiful specimens. Still later, the coils became connected, producing the shell we see today. Of interest was the statement that this shell, variously carved was used for drinking cups.

Lovell Reeve, Mr. Ulrich said, lists six varieties of Argonauta some coming from the Atlantic and Pacific coast, and others from the opposite side of the Pacific ranging from China and Japan to Australia. and New Zealand. The beautiful shells which range in color from deep sepia to white with light tan occasionally or lilac markings, are secreted only by the female and serve as a protection to the eggs. Through the body of the animal a flood of changing colors passes. Miss Higgins described such a wave of color, variations of red, through the body of a small Octopus when attacked by an enemy crab and thought it might be due to nervous reactions.

Both fossil and present day specimens were used to illustrate the talk. It was an interesting and enjoyable talk, and two specimens besides this group were shown; one which begins as a bivalve and later ib life becomes a univalve, Spirula spirula, and a Venus flower basket, that exquisite glass sponge of Japan.

Mrs. Paxon and Mrs. Ferris told of collecting the Argonauta on the Florida coast. Respectfully submitted,

Ruth E. Eaton, Secretary.

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So many members wrote in asking the price of the following new publication that we are mentioning it again."The Cenozoic Brachiopoda of Western North America" by Leo George Hertlein and U.S. Grant IV. The correct title is Mathematical & Physical Sci. UCLA Vol.3. Send $3.15 to the University of California Press, Berkeley, Calif.

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Dr. H.N. Fisk, School of Geology, Louisiana State University, Baton Rouge, Louisiana. We are very happy to add Dr. Fisk's name to our permanent mailing list.

Members of the Long Beach Shell Club

Mr. Charles Allen,1094 South King St.,Apt.E, Honolulu, T.H.
Mr. and Mrs. Fred Barnett, 80 62nd Place, Long Beach 3, Calif.
Mr. and Mrs. E.P. Baker, 417 South Downey Ave.,Downey, Calif.
Mr. and Mrs. Ralph Borman ,4331 Vermont St., Long Beach 4, Calif.
Mr. Ralph Borman Jr., College V-12, Naval Training Unit, 1301 E. California St., Pasadena 4, Calif.
Mr. and Mrs. John Q. Burch, 4206 Halldale Ave., Los Angeles 37, Calif.
Mr. and Mrs. Earl Bruch and Joan, Box 2682 Atlas Rd., Napa, Calif.
Mr. and Mrs. Thomas A. Burch, 680 W. 34th St., Los Angeles 7, Calif.
Mr. and Mrs. E.P. Chace, 24205 Eshelman Ave., Lomita, Calif.
Miss Evelyn Davis, 270 Ravenna Drive, Long Beach 3, Calif.
Ethel Donaldson, Box 507 S. Downey Ave., Downey, Calif.
Ruth E. Eaton, 326 West 5th St., Long Beach 2, Calif.
Mrs. Grace Ferris and Jane, 4304 Appian Way, Long Beach 3, Calif.
Mr.and Mrs. M.E. French, 792 West 26th St., San Pedro, Calif.
Mrs. Abby H.C. Gorham and James Gorham, 1323 East 3 St., Long Beach 4, Calif.
Mr. and Mrs. James L. Goldie, 745 Gaviota, Long Beach 4, Calif.
Miss Lena Higgins, 344 West 9th, Long Beach 2, Calif.
Dr. Howard R. Hill, 4262 Angeles Vista Blvd., Los Angeles, Calif.
Mrs. Ralph Hooper, Seward, Alaska.
Mrs. Esther Johnson,611 Ultimo Ave., Long Beach 4, Calif.
Mr. and Mrs. Clause Lehman, Louise and Eleanor, 248 Ximeno Ave.,Long Beach 3
Mrs. Leona Linderman, 80 62nd Pl., Long Beach 3, Calif.
Mrs. Ruth Libby, 817 Carson St., Long Beach 7, Calif.
Mr.and Mrs. J.A. McBride,1443 Lime Ave., Long Beach 6, Calif.
Miss Cynthia Mason, 3032 East 3rd, Long Beach 4, Calif.
Mrs. Alice Paxon, 5304 Appian Way, Long Beach 3, Calif.
Miss Julia Ellen Rogers, 355 Junipero Ave., Long Beach 4, Calif.
Miss Edith R. Rex, Avalon, Catalina Island, Calif.
Mr. and Mrs. Laurence Pelton, 4351 Long Beach Blvd., Long Beach 5, Calif.
Mr. S.G. Skinner, 630 Almond Ave., Long Beach 4, Calif.
Mr. James Stephenson, 207 Quincy Ave., Long Beach 3, Calif.
Dr. A. Haven Smith, 222 Pine St., Orange, Calif.
Miss Grace Stillwell, 337 Cedar Ave., Long Beach 2, Calif. Ph. L.B. 631-461
Miss M. Tripp, 234 Corona, Long Beach 3, Calif.
Miss Lucille Tyselling, 853 Atlantic Ave., Long Beach 2, Calif.
Mr. and Mrs. E.W. Ulrich, 1049 Island Ave.,Wilmington, Calif.
Dr. Hazel A. Wentworth, 110 Mira Mar, Long Beach 3, Calif.
Mrs. Jean Wilkins, 5939 Gundry Ave., Long Beach 5, Calif.
Miss Helen E. White, 334 East Ocean, Long Beach 2, Calif.
Mrs. Frank Eastman, 130 Elm Ave., Long Beach 2, Calif.

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Officers of the Long Beach Shell Club for 1945.

President, Mr. E.P. Baker, 417 South Downey Ave., Downey, Calif.
Vice-president and chairman of the program committee, Miss Julia Ellen Rogers, 355 Junipero Ave., Long Beach 3, Calif. Phone L.B. 334-23
Secretary-Treasurer, Miss Ruth Eaton, 326 W. 5th St., Long Beach 2,Ph.725-34
Chairman courtesy committee, Miss Grace Stillwell,337 Cedar Ave., Long Beach 2, Phone L.B. 631-461

Meetings to be held as usual on the 2nd Sunday of each month at 2:30 P .M. in the Children's Room of the Long Beach Public Library.

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA
February 1945

The minutes and other publications of the Conchological Club of Southern California are not open to subscription. However, any of our friends interested in receiving them, may send us donations or stamps to help defray the cost of material and postage.

Any institution or library interested in filing these minutes is welcome to all available back issues and a place on our mailing list without charge. Students of particular problems are always welcome to ask us for specimens for study as wellas all information we may have.

The next meeting will be held March 4, at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. at 2:30 P.M.
We are now meeting the first sunday of each month.

Please mail all news about shells, shell publications, shell collectors, shell trips, localities etc. to your editor,

John Q. Burch,
4206 Halldale Ave.,
Los Angeles 37, Calif.

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California Fish and Game, Vol.31, No.1, January,1945 has been received. The only article in this issue of particular interest to our group is " The Baloon Type Otter Trawl for Rockfishes" by W.L. Scofield. This trawl is described and is now in general use off northern California being used at depths of 60 to 80 fathoms and 6 to 10 miles off shore. Of course, no mention is made of mollusks. However, one of the most successful pieces of gear that our experience proved worth while for taking deep water mollusks of the surface varieties was a small version of just about such a trawl as described in use by this article. It grieves one to think of the countless rare specimens that are no doubt being washed over board by the norhtern fish trawlers at this time. It is safe to state that if it were possible for a conchologist to accompany these trawlers he would quickly accumulate a collection that would settle many mooted questions about rare species.

The Journal of Conchology, Vol.22, No.5, 30th November,1944, the organ of the Conchological Society of Great Britainand Ireland.

Papers in this issue of particular interest to us are " Deshayes Review of Terebra" by J.R. le B. Tomlin; " Notes on Littorina Saxatilis (Olivi)" by N.F. McMillan. The other papers and notes deal with the fauna of the British Islands.

Protozoa in Great Salt Lake" by Dr. David T. Jones, University of Utah, Salt Lake City, Utah. 8 pp, 1 page of plates.

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MORE ABOUT THE SCHISTOSOMIASIS PROBLEM by Dr. W.O. Gregg

Recently there has been received a reprint of an article entitled " Unsuccessful attempts to infect eleven species and subspecies of domestic Planorbidae with Schistosoma mansoni," Eloise B. Cram, Myrna Jones,and Willard H. Wright. Proc. Helminthological Society of Washington, Vol.11, No. 2, July,1944, pages 64-66. The species and subspecies tested were : Helisoma anceps, H. duryi intercalare, H. duryi normale, H. subcrenatum, H.

subcrenatum disjectum, H. subcrenatum plexatum, H. tenue californiense, H. trivolvis, H. trivolvis turgidum, Planorbis corneus, and Tropicorbis donbilli. In these experiments specimens of Australorbis glabratus, the known intermediate host of Schistosoma mansoni in Puerto Rico were used as controls.

Additional species of Planorbidae are desired for these tests. Instructions for packing and shipping are to be found in the Nautilus, Vol. 58, p. 32, July, 1944. In " Minutes" No. 41, p. 30, it was stated that living specimens of Tryonia were particularly desired at this time for studies in connection with Schistosoma japonicum because of the close relationship of Tryonia to the Asiatic Oncomelania. Tryonia clathrata is found in Nevada. I do not know of any authentic records of T. clathrata from California. Tryonia protea, better known as Paludestrina protea is found in the Colorado Desert, California and also in isolated localities in Nevada, Utah, and Mexico. It is suggested by Dr. Bartsch that any one who has opportunity to collect live specimens of T. protea for this research carefully record the temperature of the water where they are taken and also collect samples of water for chemical analysis. They should survive shipping by air mail is packed in wet moss as directed for packing Helisomas in the article above referred to.

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Dr. Henry van der Schalie, Museum of Zoology, University of Michigan, Ann Arbor, Michigan. " The minutes of the January meeting of your society are here and I noticed that you made a special call for a note on the interests of individuals. My request along this line will be somewhat in the line of the best interests of this Museum, and would then include the land and fresh-water shells in general. We are willing to exchange or in any other way help to sponsor the work of others. For the past few years most of my own activity has been directed to the North American fresh-water mussels and I feel best able to be of help with that group. We are making up a mailing for a few papers which have accumulated and will send some along to you. If thereare any of the members especially interested in those sent I shall be glad to try to supply those particularly interested. I appreciate receiving the minutes you send and am filing them here in our Division of Mollusks for others who may wish to see them. "

Paleontological Research Institution, 126 Kelvin Place, Ithaca, N.Y. We are honored to send this great institution a file of all available back issues and place them on our permanent mailing list.

T/Sgt. Edward Hafer, 19098776, 43 Bombardment Group, 403 Bombardment Sqdn. (heavy), A.P.O. 920, c/o P.M. San Francisco, Calif. This name was sent in by our member Edith R. Knapp with the note " The son of a friend of mine is in a hospital, for probably some time, and has become interested in sea shells. He has requested a book on the subject, which we sent him, and we think he would be interested in the bulletins if it is possible to send it." May we suggest that members having the time to do so might drop Sgt. Hafer a note. One of our soldiers in a hospital and interested in our hobby should receive our most enthusiastic greetings.

Lillias F. Cockerill, Sanibel, Florida. " .. I am interested in World Wide Shells, Marine and Terrestrial, and am willing to Buy, Sell or Exchange shells. ... The hurricane in October did a lot of damage around here . It seems to have buried most of the shells."

Fred Tobleman, 13½ Brenner St., Newark 3, New Jersey. At last I have been able to get a little leisure in which to write the article on mounting radulae which I am sending you. I have been so busy I haven't had time for any scientific work until now. *** I am offering a set of Eupleura caudata from the New Jerset oyster beds for a set of Tritonalia japonica."

Family MACTRIDAE

Genus Anatina Schumacher,1817. Type (by monotypy), Anatina pellucida Schumacher -- Mactra anatina Spengler. (fide Grant and Gale,1931,p 406).

" Shell small or medium in size, thin-shelled, ventricose, beaks adjacent, posterior gaping, laterally somewhat flattened, sub-rostrated; sculpture consisting of fine growth lines only or of growth lines and concentric undulations; hinge with prominent chondrophore; cardinal teeth small but definitely formed, partly overhanding the chondrophore; anterior lateral obsolete, posterior small and short; hinge plate excavated in front of cardinals, flattened behind; ligament separated from chondrophore by a shelly wall; pallial sinus short, broad, not confluent below with the pallial line."

Subgenus Raeta Gray,1853. Type (by monotypy), R. campechiensis (Gray),1825 -- canaliculata Say,1822 -- Lutraria plicatella Lamarck,1818.

" Shell rather large, convex, compressed posteriorly; sculpture of concentric plications, surface of fresh specimens vermiculate" (Grant & Gale).

Anatina (Raeta) undulata (Gould), 1851. " San Pedro, Calif. to Panama" (Dall, 1921). Type locality, La Paz, Lower Calif., Mexico.

Grant and Gale,1931, p. 407 state " Recent specimens of this species from La Paz, the type locality, have the umbones noticeably anterior to the middle of the shell. In the Stanford collection specimens labelled San Pedro which look like Pleistocene fossils have the umbones nearly medial"

Our only experience in collecting this species was the finding of a number of more or less broken valves washed in on the sandy beach below Ensenada, Mexico. In these specimens the umbones are noticeably anterior as Grant and Gale state of the La Paz specimens. Later in our dredgings in Todos Santos Bay we brought up only very badly broken fragments. This species is so fragile that it sounds discouraging to me to expect to dredge them in good condition. Of course, it is not from deep water. (Burch). Dr. Howard R. Hill of the Los Angeles Museum reports that the museum has specimens from Long Beach and Terminal Island and that they all have the umbones anterior to the middle of the shell.

The distinguishing features of the four genera involved in this family in our fauna as adapted from the " Key to Pelecypod Genera" , Keen and Frizzell are:

With an A shaped cardinal toorh	Anatina
Shell broadly gaping behind	Schizothaerus
Chondrophore set off from ligament by a shelly lamina..	Mactra
Chondrophore not " " " " "	Spisula

Genus Mactra Linnaeus,1767. Type (by subsequent designation Fleming,1818) Cardium stultorum L. (The designation by Fleming is given us by Dr. A.M. Keen (Per. Comm. Dec. 1944). Grant and Gale gave designation by Gray,1847. Dall, Bartsch and Rehder,1938 refer it to Anton,1839.

" Dentition normal in number and distribution of teeth; ligament set off by a shelly lamina rising between chondrophore and ligament; cardinals generally coalescent above; laterals smooth or finely granular."

Under the subgenus Mactrotoma Dr. Dall described several Sections and each of three west coast species under different Sections. The consensus of opinion seems to be that the distinctions are so small that they should be adequately covered in the specific descriptions. Therefore, we shall not consider subgenera.

To state that our knowledge of this group has been in a state of confusion would be a great under statement. There seems to be little excuse for this because our species are not difficult to distinguish. The difficulty is purely one of nomenclature. Therefore, in this paper we shall not attempt to rectify the many conflicts in the taxonomy, but propose to retain the names commonly applied to each species stating the problems involved. An effort will be made to figure each species and give enough information about it to enable students to know which species we are discussing.

Mactra californica Conrad,1837. Neah Bay, Washington to Panama. The range of this species has been a matter of much discussion. Pilsbry and Lowe, (Proc. A.N.S.P. v.84,1932) discuss the species in their key on p. 88 and figure it pl. 16. Dr. A. Myra Keen (Per. Comm. Dec. 1944) states " Eric Jordan collected M. californica at Manuel's Lagoon; Wiedey and Valentine collected some specimens at La Paz, which are in our collection, and we have one lot recently sent in by a collector in Panama from Venado Island, Panama Bay which is not more than subspecifically distinct from M. californica. " " According to Pilsbry and Lowe's key the specimens of Mactra from Panama are M. californica."

The type locality is Santa Barbara. Grant and Gale, 1931, p. 393, state the data on this very well " This is the common small Mactra of southern California. It is rather flat, elongate, and the laterals are short and close to the cardinals and chondrophore. It is the type of Dall's section Micromactra."

Mr. A.M. Strong calls attention to the fact that the undulations or waves near the umbones form a distinguishing feature of this species in our fauna.

Collecting data: Very common in the lagoons and bays and easily spaded up from 3 to 6 inches below the surface of the sand. We have taken it by hundreds from Newport and Anaheim Bays. It does live in the open sea though and is rather common as a beach shell from Long Beach to Huntington Beach in our experience. (Burch). Reported by W.J. Eyerdam from Clallam Bay, Strait of Fuca.

See figure on following page.

Mactra nasuta Gould,1851. San Pedro, Calif. to Mazatlan, Mexico. Type locality, San Pedro and Mazatlan.

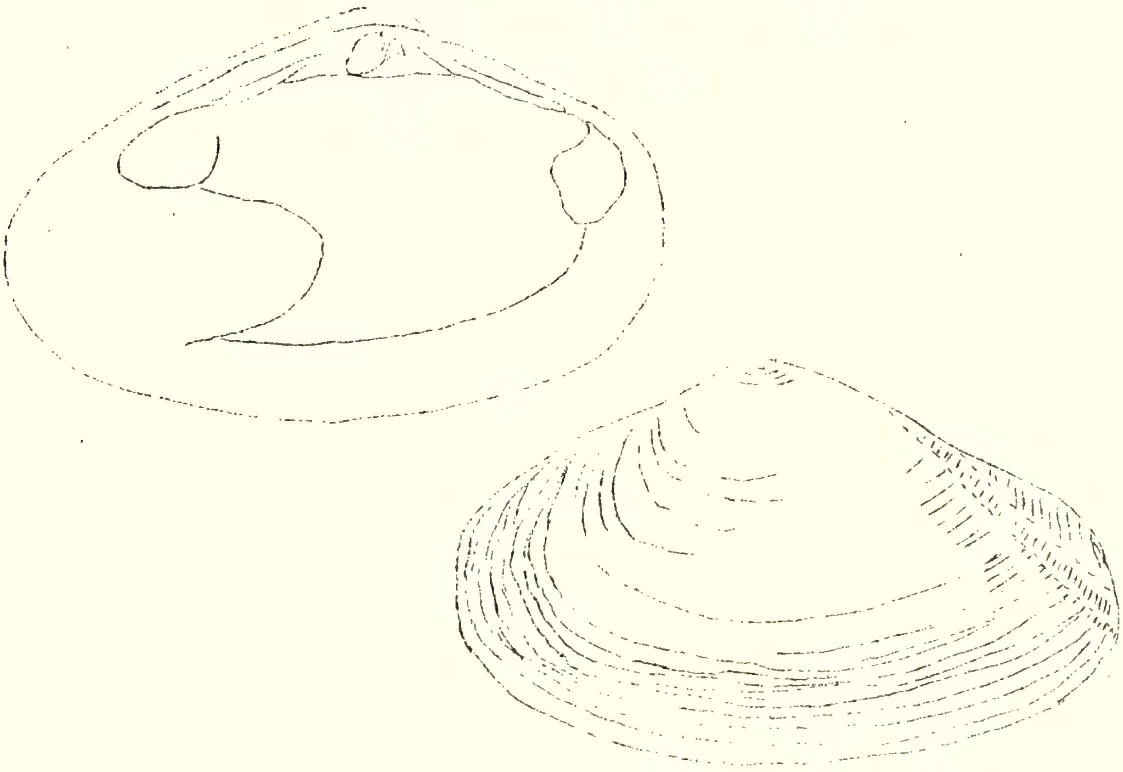
There has been a great deal of confusion about the name nasuta , but the shell local collectors have been so labelling is certainly the same species Dr. Dall called nasuta. Our shell is almost identical with the figures of fragilis to which Dr. Dall compared nasuta. This will be shown in the following figures.

We must definitely take issue with the following statement of Grant and Gale, p. 405 " Mactra nasuta Gould, which was stated to inhabit Mazatlan, Mexico and San Pedro, California, may be a rare species which is now not definitely known. The shells in California collections which are labelled M. nasuta generally prove to be the young of Schizothaerus nuttallii." The shells we have been labelling nasuta from Newport Bay, San Onofre, Punta Banda etc. are definitely placed in Mactra by the hinge. Furthermore, in collecting them they are instantly separable from the common californica by a difference in the color of the periostracum which is rather a shiny gray on nasuta and a dull brown on californica. Habitat about 6 inches below the surface of the sand in sandy lagoons or beaches. Dr. A. Myra Keen (Per. Comm. Dec. 1944) " Our specimens, which have the shining gray epidermis you mention and are definitely not young Schizothaerus , are all from San Pedro."

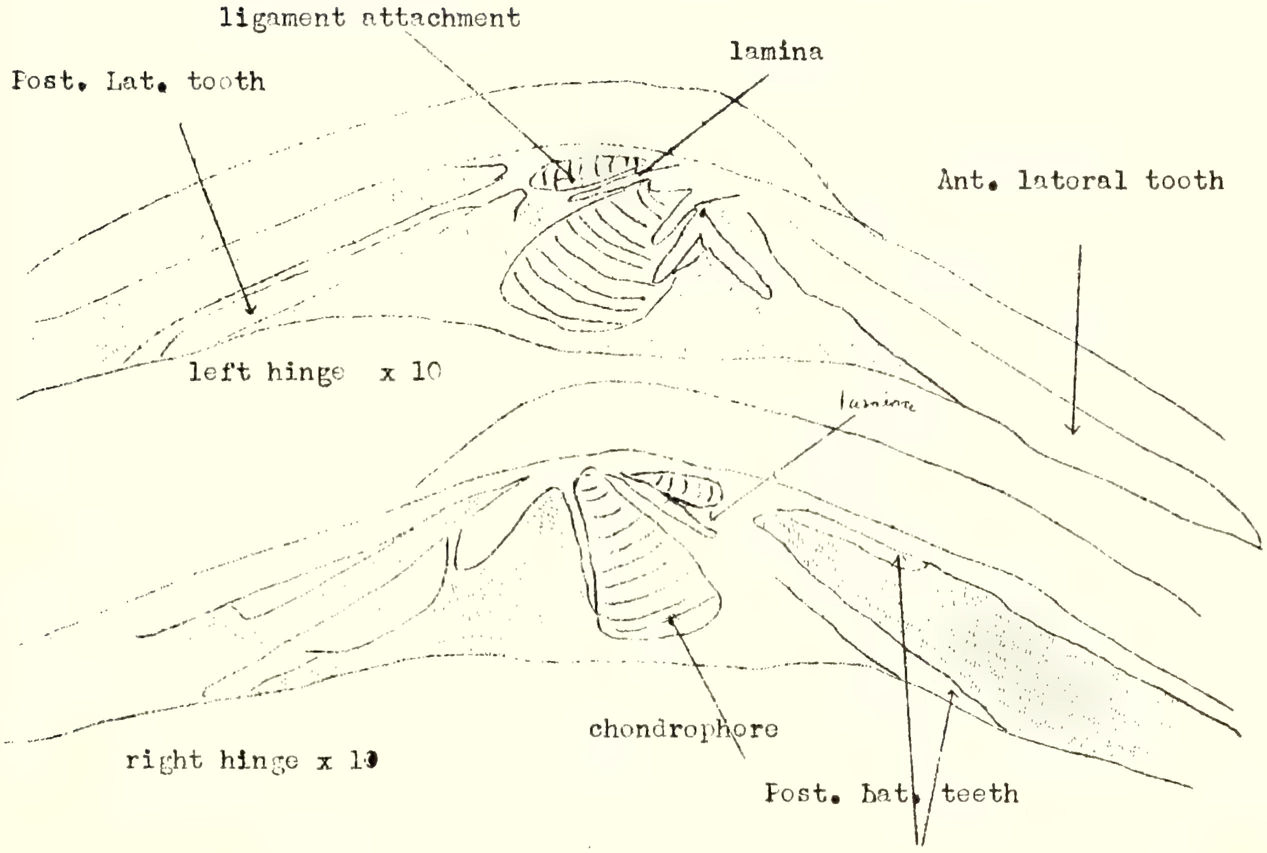
Con. page 7

#44 p 5

Mactra californica Conrad, 1837
Newport Bay, Calif. MS 451



left valve x 3


ligament attachment
lamina
Post. Lat. tooth
Ant. lateral tooth
lamina
chondrophore
Post. Lat. teeth

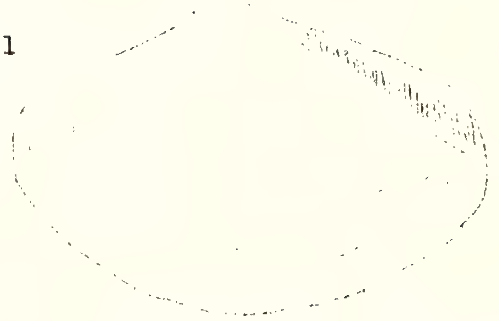
left hinge x 10

right hinge x 10

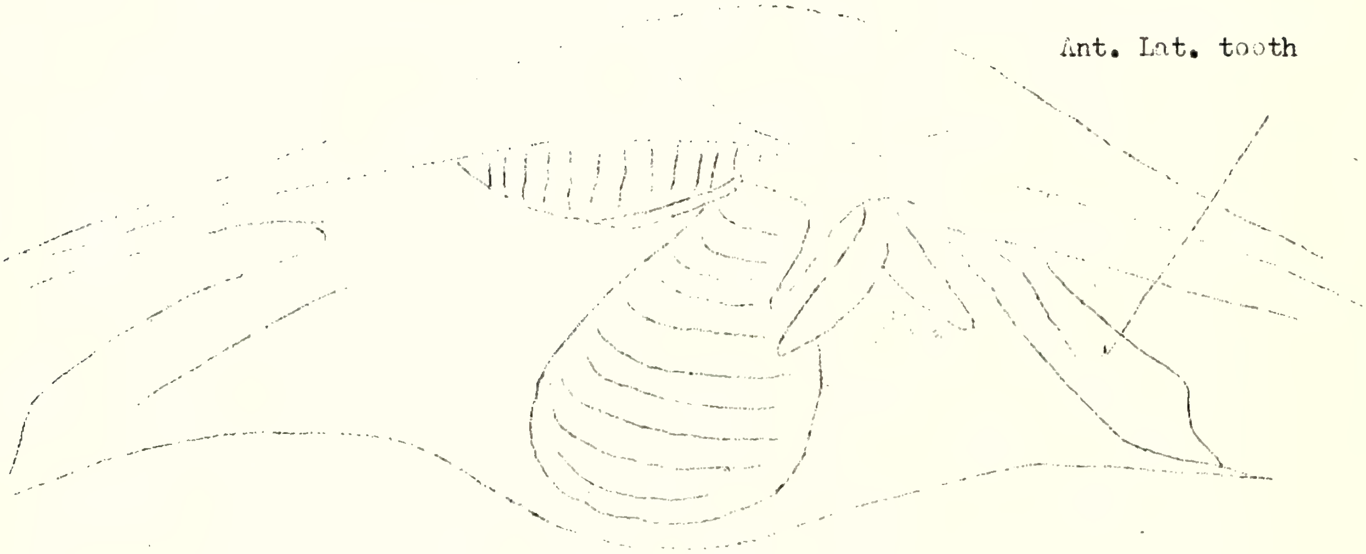
#14 p 6

MS 459

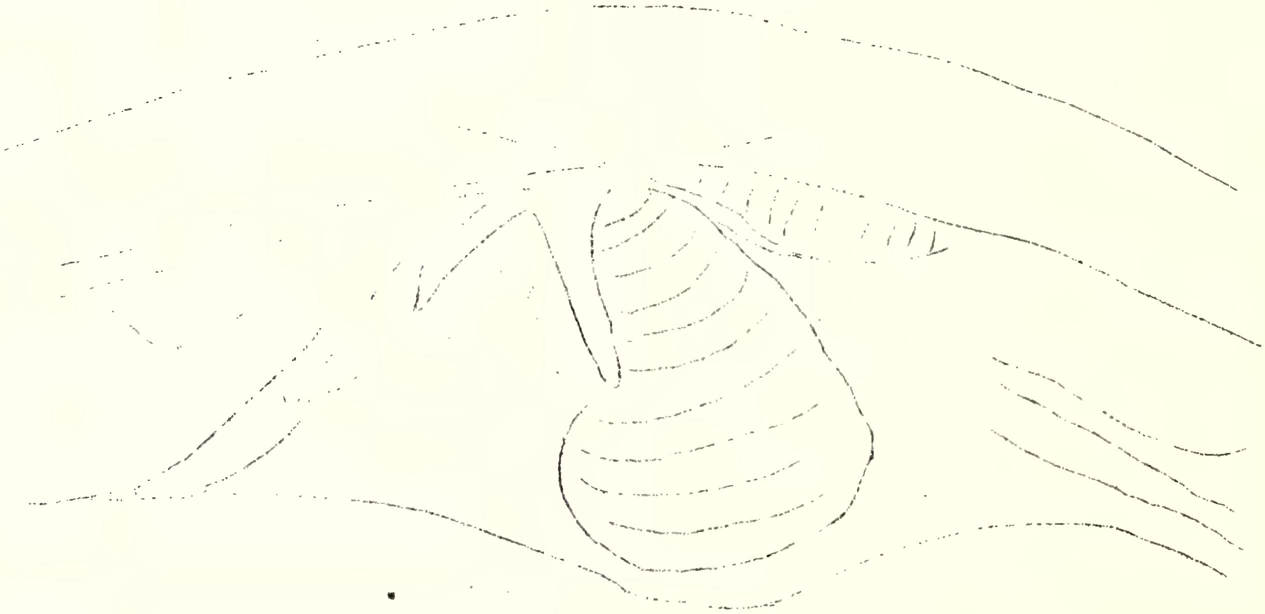
Mactra nasuta Gould, 1851
Newport Bay, Calif. 2/37



left valve X1


Ant. Lat. tooth

left hinge x 7



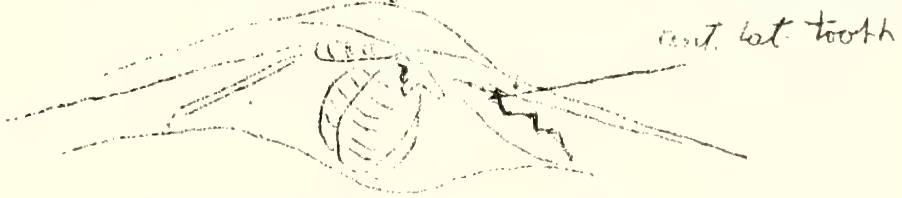
right hinge x 7

Mr. A.M. Strong (Per. Comm. Dec. 1944) gives some very interesting comments on Mactra nasuta Gould. " This was described in Proc. Boston Soc. Nat. Hist., vol. 4, p. 88. I find no reference to a figure. Carpenter, Rept. 1863 says (suppressed) but revived for young shells from Santa Barbara. He does not state by whom it was suppressed or why. Packard states it is not of Carpenter. Dall, Trans. Wagner Inst., vol.3, pt.4, p. 894, stated that Mactrotoma fragilis Gmelin referred to by Carpenter from the west coast should be M. nasuta Gould. Carpenter's references are Rept. 1856, p. 243,246,304. The type locality is given by Oldroyd as Mazatlan. Carpenter lists it from Lower California but not from the Gulf. Pilsbry and Lowe list it as rare, valves on the mud flats, Mexico and Central America. It probably does not reach as far north as California. The following are listed as synonyms and should be checked: M. californica Deshayes, Conch. Ic. Pl. 20, fig. 114 ; M. deshayesii Conrad, Am. Jr. Conch. vol.3, append. p. 46; M. ovalina Wein. not Lam.

The following comments by Mr. A.M. Strong should no doubt have been placed under the discussions of californica. " Spisula californica Conrad. This is the second of the species collected at Santa Barbara by Nuttall and described by Conrad in the Jr. Acad. Nat. Sci. Phila. Vol.7, p. 340, pl.18, fig.12. It definitely is not the shell identified by Cooper and Carpenter and probably by Dall in his earlier writings. Nor is it the shell figured by Packard and reproduced by Oldroyd in Pl. 20, figs. 4,5,6. It probably is the shell figured by Dall in Proc. U.S. Nat. Mus. vol. 66, pl. 20, fig.1, which shows the undulations under the beaks very plainly. It is this shell that is accepted by Pilsbry and Lowe and figured in Pl. 16, fig. 2.

Dr. A. Myra Keen (Per. Comm. Dec. 1944) ".. I include a copy of Reeve's figure of " Mactra californica Deshayes", which must be attributed to Reeve on the basis of priority. This homonym was renamed Spisula deshayesii Conrad 1868, Amer. Journ. Conch. vol.3, no.3, appendix, p. 46. Reeve remarks,"This species is not distinguished by any peculiarity of form or sculpture, and has very much the appearance of a small Lyra." That comment certainly applies to his figure. As for most of the other species, the only final solution to our problem is to hunt up the types or ascertain positively that they are lost, then designate a neotype from the type locality where this seems reasonable. Otherwise, as with the " Panama" ones, probably new descriptions based on good material would be preferable. Pending that, the best course will be, I believe, to write the names as follows : Mactra nasuta Gould (of authors) , or (auct. if you prefer. The whole thing is obviously a bigger problem than we can settle just now. The only types I located on my trip east were Spisula falcata (Gould), USNM 5843, and Mactra dolabriformis Conrad, ANSP 51411.

The following note is by Thomas A. Burch who drew the figures : "Since Dall says that Mactra nasuta is the counterpart of Mactra fragilis it may be of interest to mention a few minor distinctions apparent between our specimens and Dall's figure (of fragilis) . This is concerned with the anterior lateral tooth in the left valve, which in both species is partially divided into two teeth. In M. nasuta these are side by side while in M. fragilis they are end to end. Mactra nasuta differs from M. californica in that the anterior end is more rounded in M. californica and also the anterior inferior lateral tooth in the right valve of M. californica is not divided into two separate teeth while it is in M. nasuta. In M. nasuta these two lateral teeth are in line and join the anterior cardinal tooth."



Mactra fragilis Gmelin fide Dall

In leaving the genus Mactra it is obvious that we recognize but two species, M. californica Conrad and M. nasuta Gould. The third name found on most faunal lists is Mactra dolabriformis Conrad, 1867. However, the shell accepted and labelled with this name by local collectors is clearly a Spisula . It will be discussed at length.

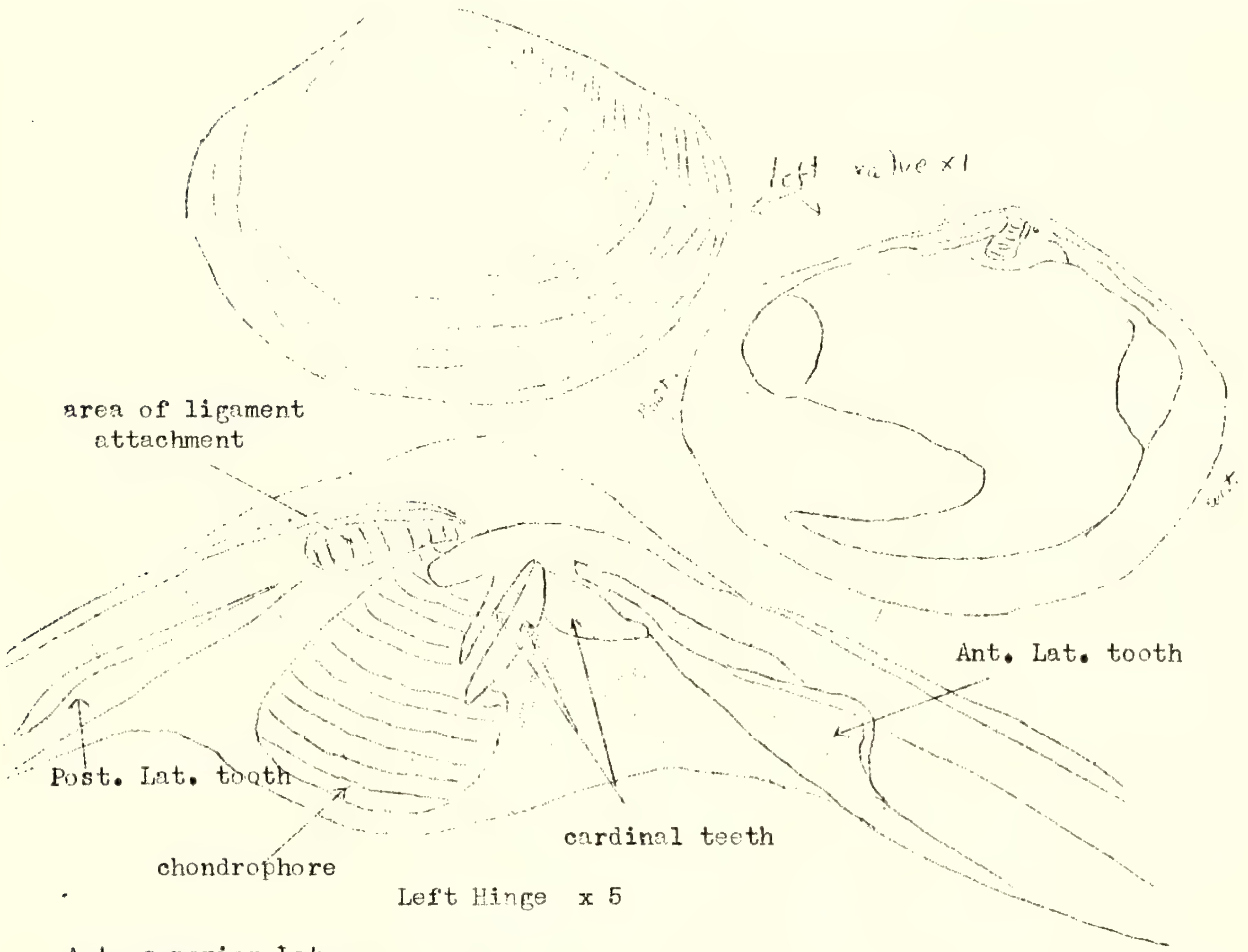
The following note is from Thomas A. Burch, dated Jan. 10, 1945. " I have just finished drawing the Spisulas and making out the key. But before getting to the key, I should explain my ideas as to the hinge of Spisula and its development as shown in our local species and in this way explain my key to species which follows. In my opinion the hinges of S. catilliformis, S. "hemphillii", and S. alaskana are the most primitive, or at least the less differentiated, since these species have but two lateral teeth in the left valve and four in the right valve (2 right & 2 left) In the other species of Spisula one or more of these lateral teeth is separated into two more or less distinct teeth. Perhaps erroneously I have considered this a sign of differentiation and therefore advancement, Since I always get confused when teeth are numbered, as in Keen and Frizzell's Key to Pelecypod Genera, I have described the teeth according to their actual position with regard to the hinge A complicated example would be proximal (near the hinge) anterior inferior lateral tooth in the right valve of S. planulata. While this may be confusing also, it can easily be figured out with the shell or drawing.

KEY TO SIECIES OF SPISULA

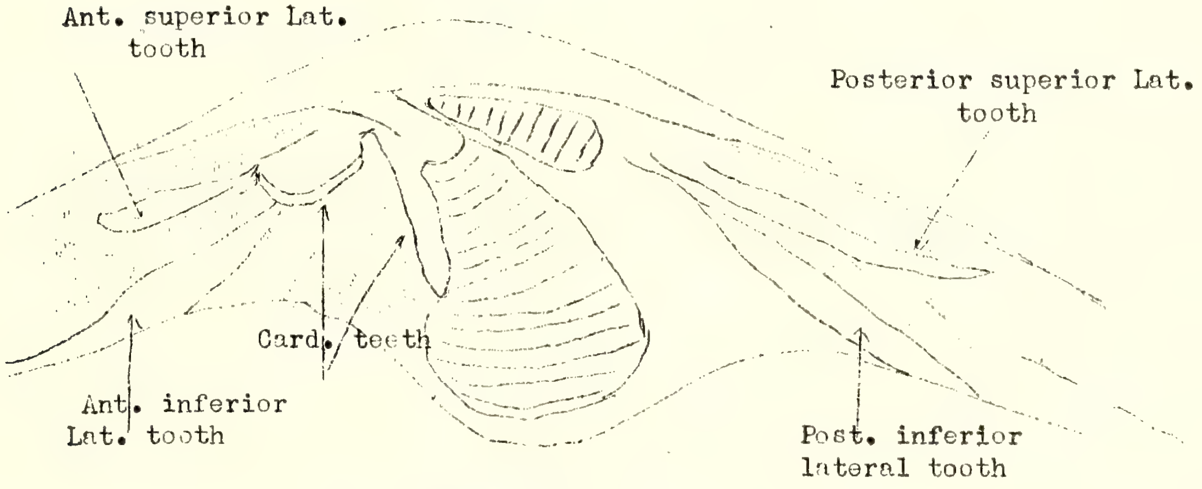
Posterior end longer than anterior
    Pallial sinus deep .... S. catilliformis
    Pallial sinus shallow .... S. polynyma alaskana
Posterior end shorter than anterior
    Right valve with anterior inferior lateral tooth
    not divided into two distinct teeth ....S. " hemphillii"
    Right valve with anterior inferior lateral tooth
    divided into two distinct teeth, the proximal
    joining or nearly joining the anterior cardinal
    tooth.
    Left valve with anterior lateral tooth not divided
    into two distinct teeth
        Anterior superior margin of shell definitely
        convex....................................... S. falcata
        Anterior superior margin of shell nearly
        straight .... S. planulata
    Left valve with anterior lateral tooth divided
    into two distinct teeth .... S. " dolabriformis"

While I believe that the above key should be adequate to separate these species, reference to the accompanying figures will bring out further differences not only in the shape but in the hinge also. For instance the hinge plate (in our small series) of S. falcata is much smaller in proportion to the cardinal teeth than in either S. planulata or S. " dolabriformis", The proximal anterior inferior lateral tooth of the right valve is nearly fused with the anterior cardinal in S. "dolabriformis", definitely separated from it in S. falcata and intermediate in S. planulata.

Spisula catilliformis Conrad, 1837 L. S. 56
Alamitos Bay, Los Angeles Co.


left valve x1
Post
ant.
area of ligament attachment
Ant. Lat. tooth
Post. Lat. tooth
chondrophore
cardinal teeth

Left Hinge x 5


Ant. superior Lat. tooth
Posterior superior Lat. tooth
Card. teeth
Ant. inferior Lat. tooth
Post. inferior lateral tooth

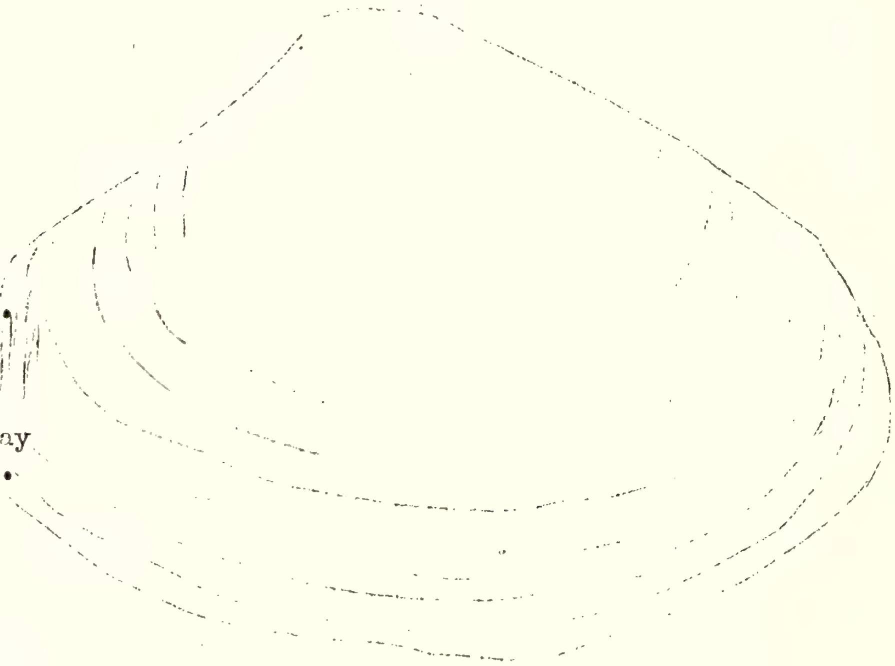
Right Hinge x 5

#44 p 12

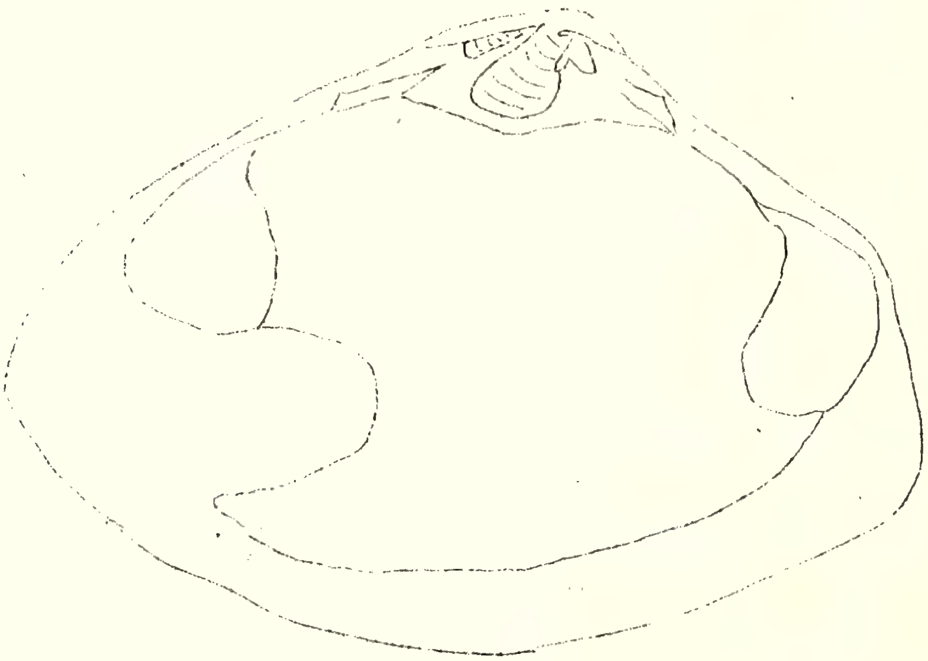
'M S 457

Spisula polynyma alaskana Dall,1894
Unalaska, Aleutians, 6/1932
W.J. Eyerdam Coll.- Sandy outer beach

Note- this spec.
had been broken
& repaired, so
this shape at
anterior end may
not be typical.

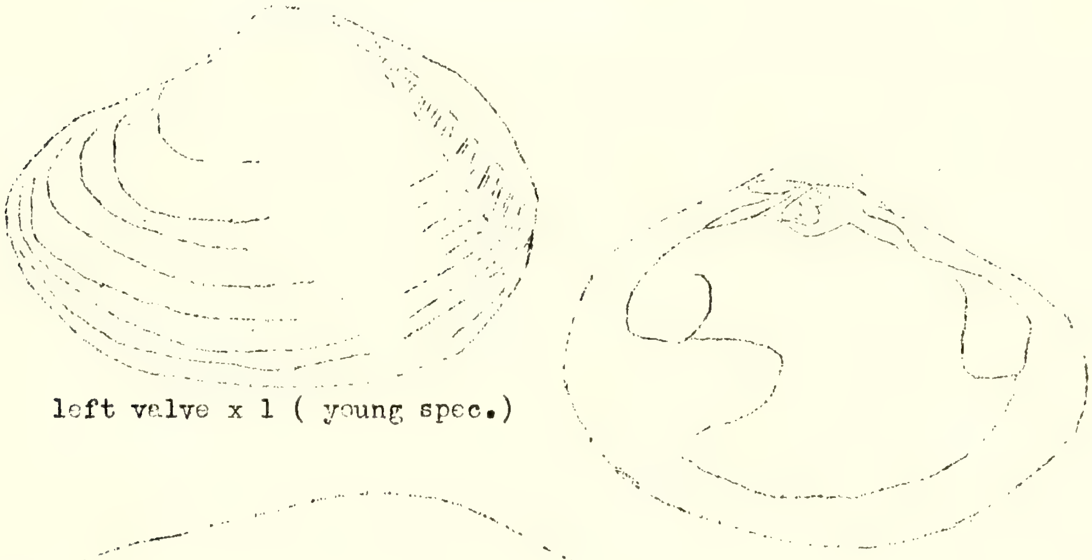


Left valve x 1

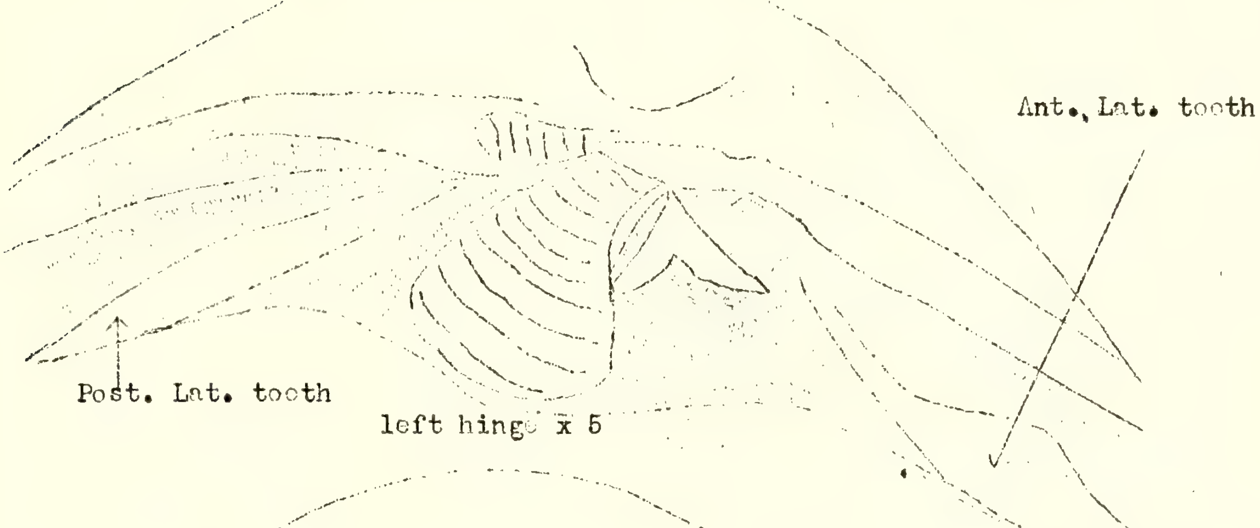


#44 p 11

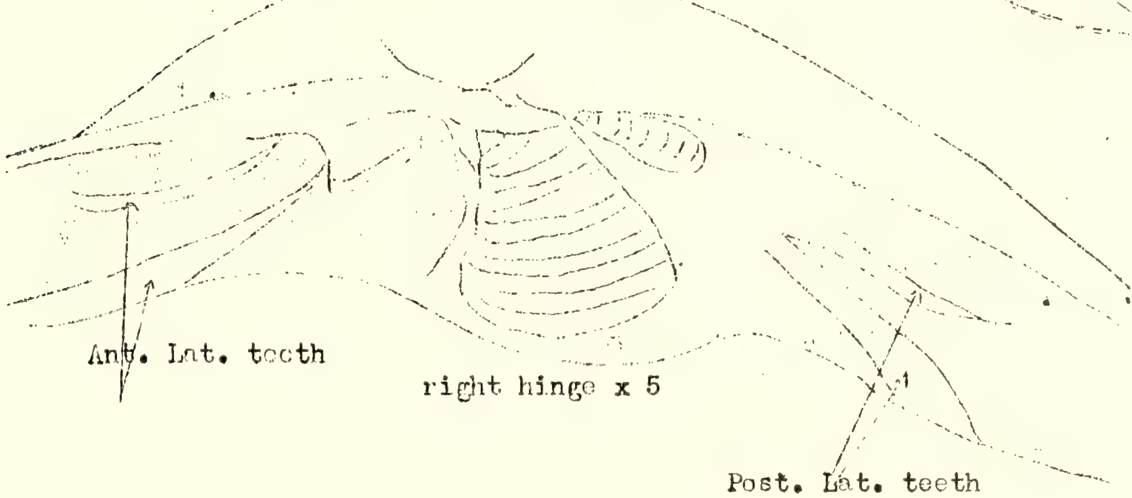
Spisula hemphillii (Dall),1894
Alamitos Bay, Calif. M S 455



left valve x 1 (young spec.)

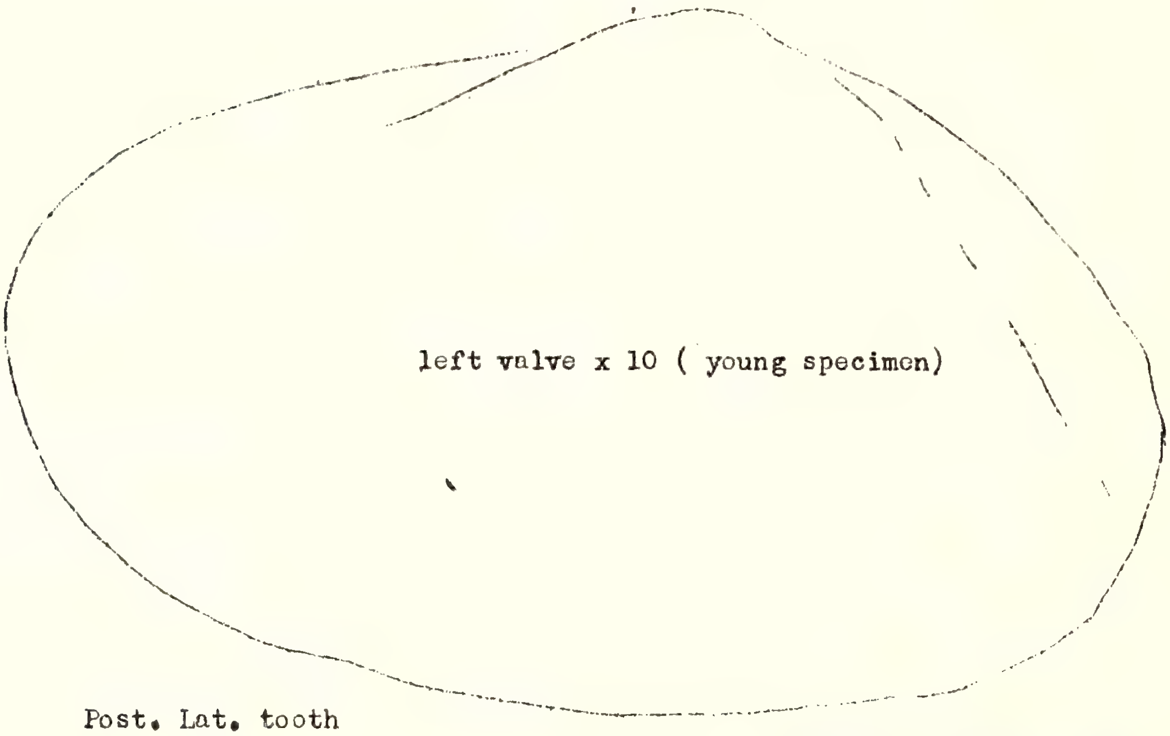

Ant., Lat. tooth
Post. Lat. tooth

left hinge x 5

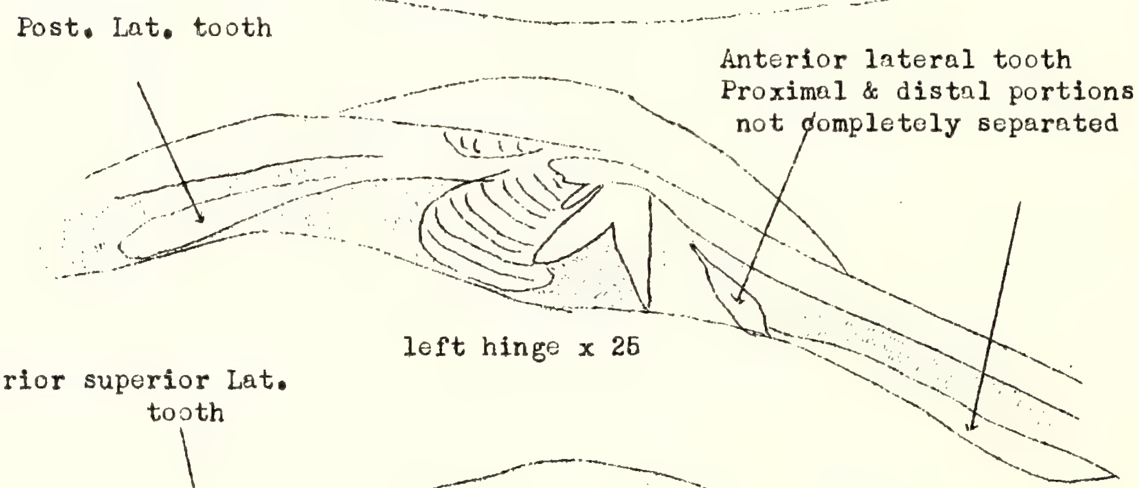

Ant. Lat. teeth
Post. Lat. teeth

right hinge x 5

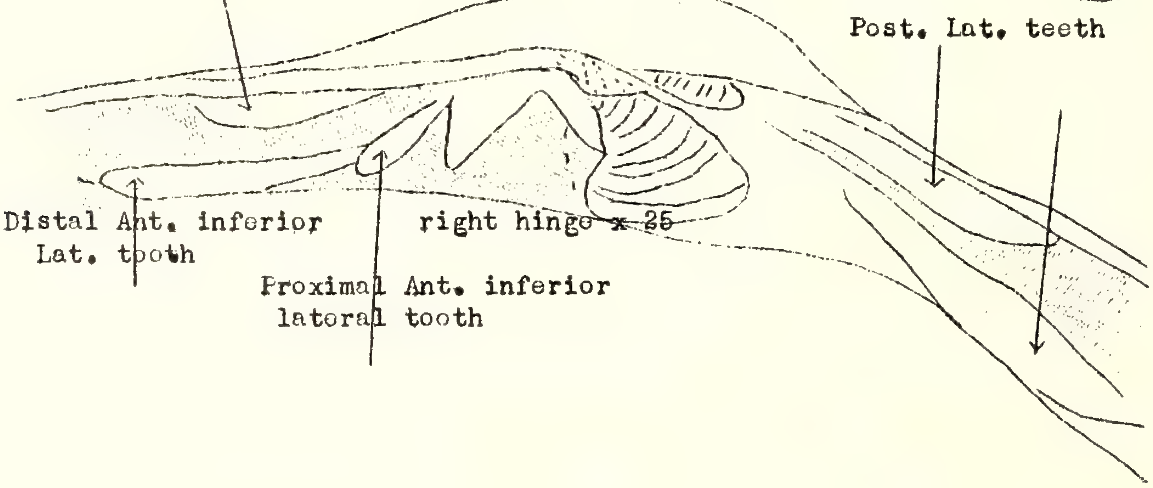
Spisula falcata (Gould),1850 M S 454
Monterey, Calif. 20 fms. shale 8/1940



left valve x 10 (young specimen)


Post. Lat. tooth
Anterior lateral tooth
Proximal & distal portions
not completely separated

left hinge x 25

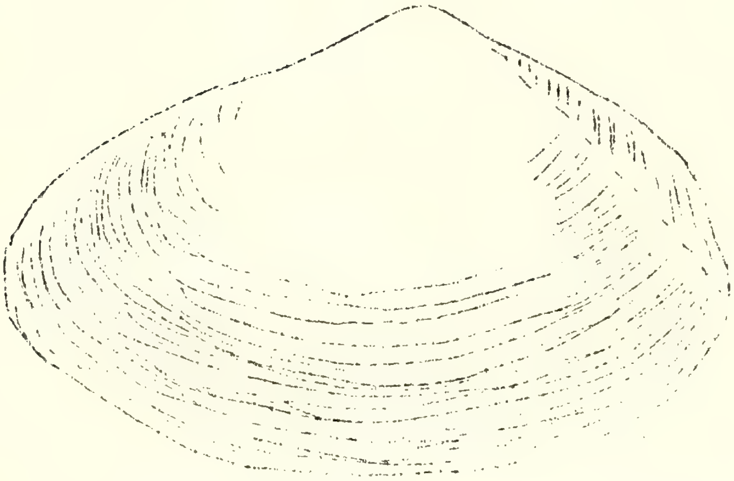

Anterior superior Lat.
tooth
Post. Lat. teeth
Distal Ant. inferior
Lat. tooth
Proximal Ant. inferior
lateral tooth

right hinge x 25

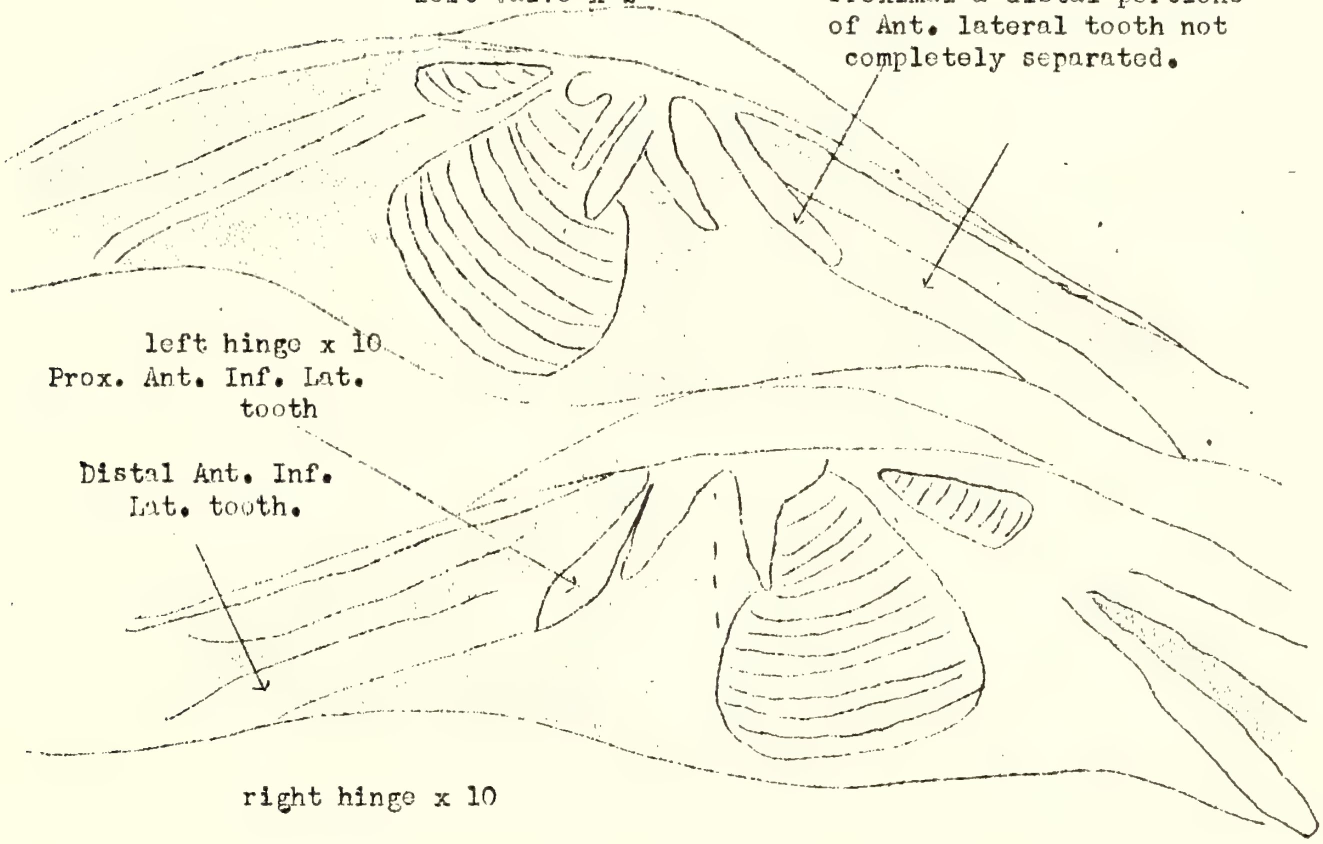
#44 p 13

M S 452

Spisula planulata (Conrad),1837
Morro Bay, Calif. 7/1936



left valve x 2



Proximal & distal portions
of Ant. lateral tooth not
completely separated.

left hinge x 10

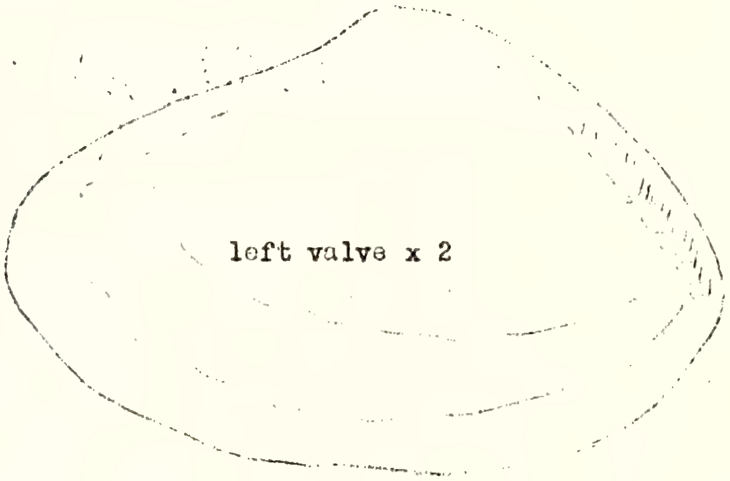
Prox. Ant. Inf. Lat.
tooth

Distal Ant. Inf.
Lat. tooth.

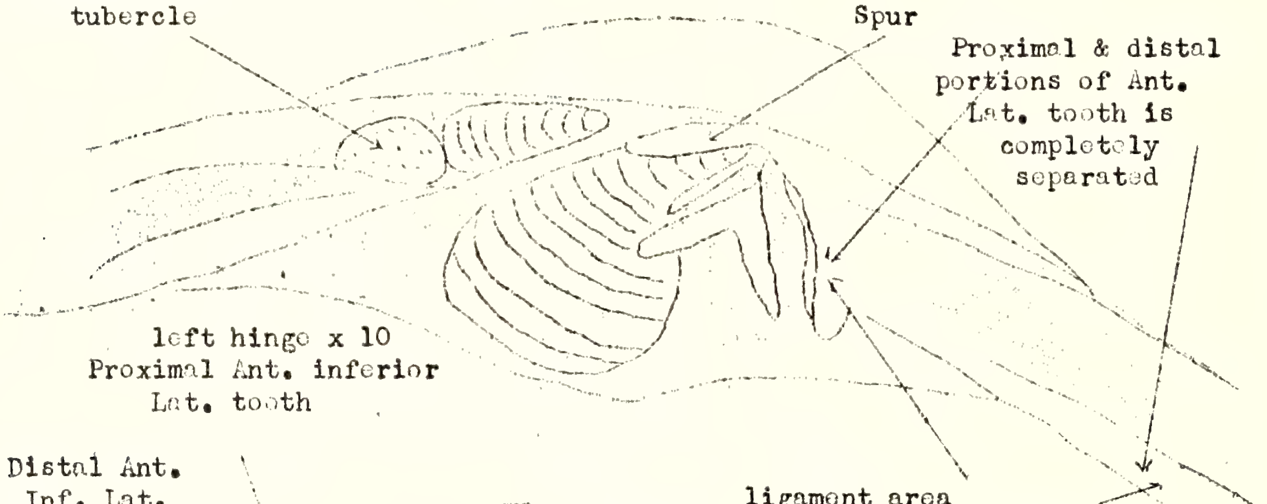
right hinge x 10

#44 p 14

Spisula " dolabriformis" Conrad, 1867
Estero, Todos Santos Bay, Lower Calif., Mex.
10/1936 littoral- sand M S 453

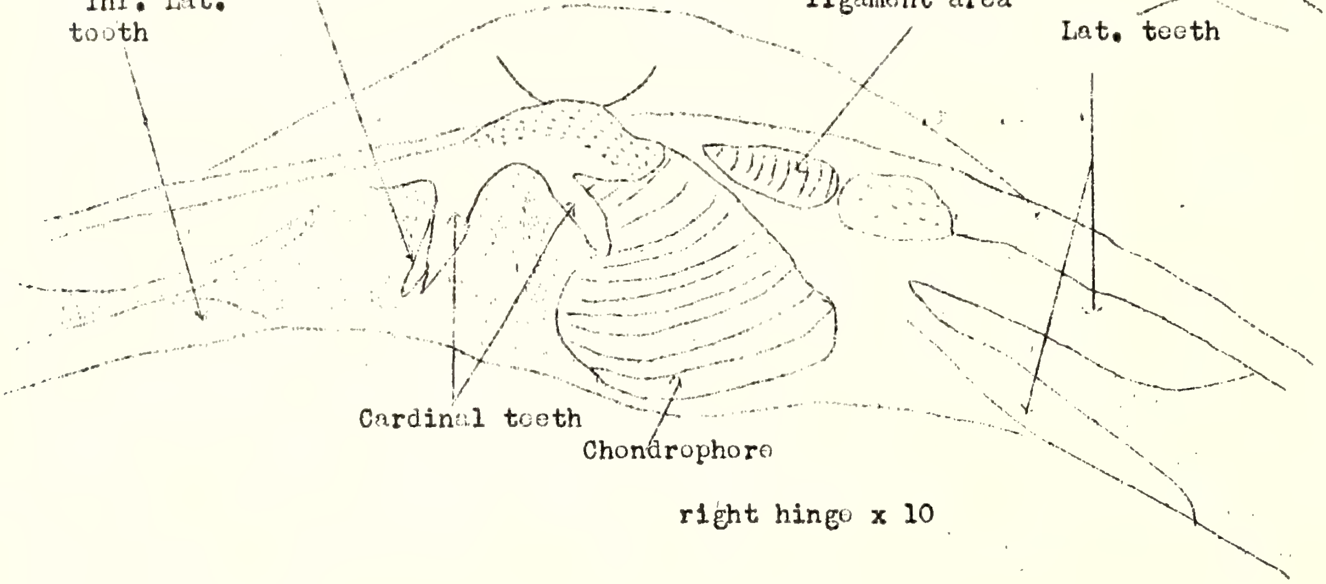


left valve x 2

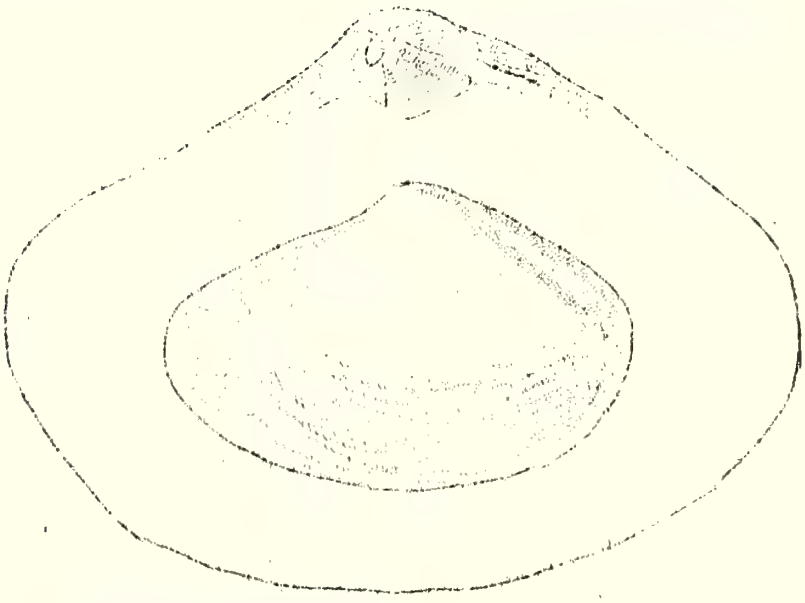

rounded punctate tubercle
Spur
Proximal & distal portions of Ant. Lat. tooth is completely separated

left hinge x 10

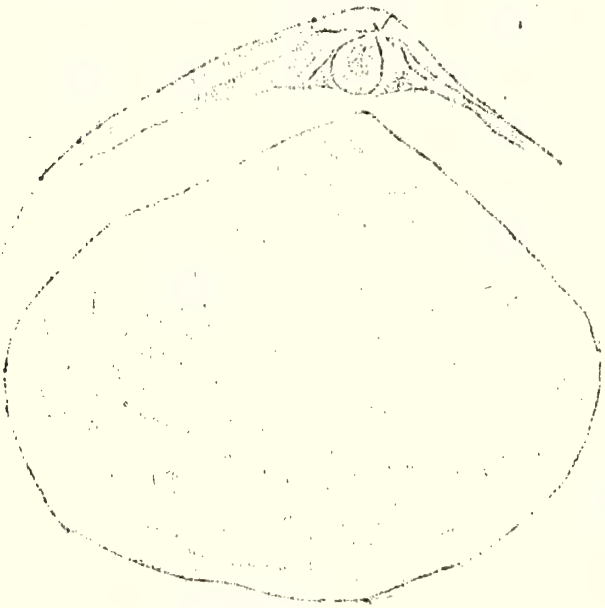
Proximal Ant. inferior Lat. tooth


Distal Ant. Inf. Lat. tooth
ligament area
Lat. teeth
Cardinal teeth
Chondrophore

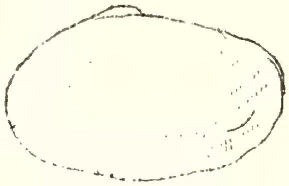
right hinge x 10



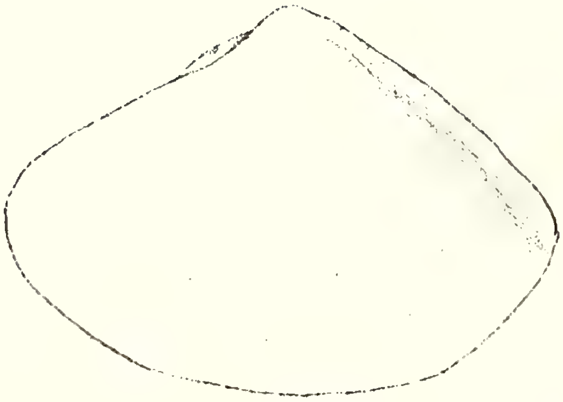
Spisula dolabriformis Conrad
Amer. Journ. Conch. v.5, pl.12, fig.1, 1869.
(original figure of species)



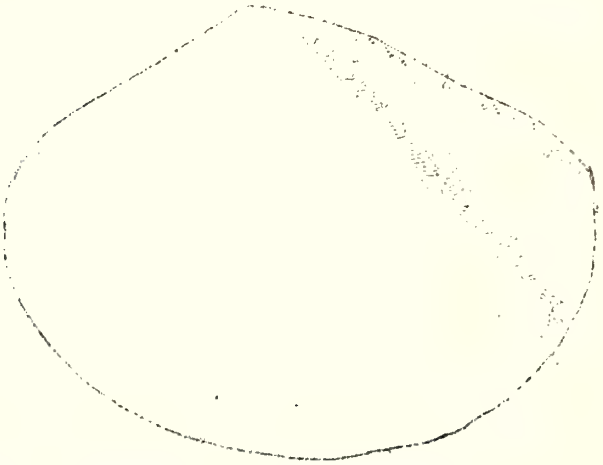
Spisula catilliformis Conrad
Amer. Journ. Conch. v.5, pl.13, fig.1.



Mactra californica "Deshayes" Reeve,1854
-- Spisula deshayesii Conrad,1868.



Mactra dolabriformis (Conrad), 1867
Nautilus, vol.7, pl.5, fig.1
as interpreted by Dall



Spisula catilliformis Conrad,1867
ibid fig.3

Before taking up our distributional study of the genus Spisula and its species it seems logical to consider the dolabriformis problem. The opinions of members and other data will simply be stated without regard for sequence here.

Mr. A.M. Strong (Per. Comm. Dec. 1944) writes of Mactra dolabriformis (Conrad),1867. " This was described in Am. Jr. Conch., vol.3, p 193 and the type locality given as Panama. It was figured in Am. Jr. Conch. ,vol.5, pl.12, fig.1 (p. 108) but this figure seems to have been overlooked as I find no reference to it. Dall redescribed it and figured it in Nautilus, vol.7, p. 138, pl. 5, fig.1. It is also mentioned in Nautilus, vo..8, p.40. Oldroyd copies Conrad's description but does not figure it. Both Packard and Grant and Gale discuss the species but do not figure it. I find no other figure or description. It is difficult to tell what California shell Dall had in mind. Conrad seems to give a natural sized figure. It is 105 by 75 mm."

Mr. Strong's statement above outlines the question other than consideration of which species Conrad intended to describe since his figure (see figure on page 16 of these minutes) is thought by some to figure two different species. In the preliminary discussions John Burch called attention to the fact that the large outer shell in Conrad's original figure of Spisula dolabriformis is a perfect figure of the shell we have been calling Spisula hemphillii Dall, 1894 and suggested that perhaps Dr . Dall had entirely overlooked this plate of Conrad's which appeared three years later than his original description. The descriptions also seemed to bear out the conclusion that dolabriformis is hemphillii and the species described as dolabriformis by Dall without a name. Dall in his redescription of dolabriformis (Nautilus 7, p. 138) (also see figures on p. 16 of these minutes) states for example " polished white under a dull brown epidermis" which is just what we have in the species we have been labelling with this name. On the other hand Conrad's original description describes an " epidermis yellow-olive" which is exactly what we have in the species we have been calling hemphillii Dall. However, it is interesting to note that both Mr. George Willett and Dr. A. Myra Keen independently suggested that Conrad's figure (see page 15) indicates a composite type and that the smaller figure inside of the larger figure seemed to them to be of a different species. This observation is well stated by Dr. Keen (Per. Comm Dec. 1944) " Reviewing the problem of the Mactridae again, I think you have something, though I wonder if the matter does not present a further complication, thusly: The original description of Spisula dolabriformis Conrad 1867, is as Mrs. Oldroyd copies it, with the added discussion," Somewhat like Mactra exoleta in outline but less elevated and not so ventricose." The first figure, or rather, perhaps, figures, were published by Conrad in 1869, Amer. Jour, Conch. vol.5, pl.12, fig.1. This illustration shows a hinge of a right valve which seems identical to me with Dall's S. hemphillii in all respects; but it also shows the exterior of a left valve only about half as large, longer in proportion, and evidently less ventricose. This figure of a left valve corresponds pretty well with Dall's figure in Naut. vol.7,pl.5, fig.1, in his redescription of Mactra dolabriformis. I wonder, therefore, if Conrad's original specimens did not represent two species, one a Mactra, the other a Spisula. This being the case, one valve would have to be designated by some later author as the lecto-holotype. According to my notes, only one valve is extant, which is No. 51411 in the collection of the Academy of Natural Sciences, Philadelphia. If this is true, the concept of dolabriformis will be fixed when we find out which of the two valves shown in Conrad's figure (if either) is represented. Why don't you write Dr. Pilsbry about it and ask him to make the comparisom.

If you have enough specimens of M. dolabriformis Auct. to spare him one (The Academy never likes to return material), you might ask him to see whether or not this entity is one represented by their type specimen. Perhaps he could lay off their type on a piece of paper and make a tracing of the outline for you, too. Until you can get some such concrete evidence your hunch remains just a well@justified suspicion. I doubt very much whether Dr. Dall ever studied Conrad's type material. Certainly he gave no evidence of it in his discussions. Therefore,he very well could have been wrong in his interpretation of the species." Dr. Keen in another note comments " The locality label (on the type at ANSP) reads " California" even though Conrad cited Panama as the type locality in his description. "

In this connection it might be well to consider the fact that the species we know as hemphillii Dall has in recent years been collected in the Panamic province (Eyerdam from Corinto, Nicauragua), and it is therefore quite possible that Conrad had that species from Panama.

However, we have the additional complication in that the species most of the members have been labelling Mactra dolabriformis is in fact a Spisula. This point is discussed by Thomas A. Burch in the following note.

"None of the specimens that I have seen adequately fit the smaller shell figured by Conrad as S. dolabriformis, but what we have been calling dolabriformis comes the closest to it. It is possible that when Dall redescribed S. dolabriformis he described this smaller shell and then described the larger shell as S. hemphillii. Against this idea is your suggestion that since Dall distinguished very carefully between Spisula and Mactra, he certainly would have realized that the shell under consideration is a Spisula and not a Mactra. Still another point is that his type figure is not the shape of the shell we have been calling S. dolabriformis-- for that matter it is not the same shape as the smaller shell figured by Conrad. In my opinion Dall did not describe either of the shells figured by Conrad but rather figured a species of Mactra which I have not seen from this coast. I also believe that Conrad figured two species, one of which we have been calling S. hemphillii and the other what we have been calling M. dolabriformis. If this be true the name S. dolabriformis should be used for whichever one of Conrad's shells is still in existence (if either). If only the small shell is found, S. hemphillii could still be used for the large shell and Dall's description and figure of S. dolabriformis should be ignored or given a new name.

If you take the opposite view and consider the large shell as type , S. hemphillii would be a synonym , and what we have been calling dolabriformis would be without a name. It seems more intelligent to leave Dall's unknown species without a name instead."

(see figures on pages 14,15,and 16)

Genus Spisula Gray,1837. Type (by subsequent designation, Gray,1847), Mactra solida (L.).

"... ligament sagittate, set in a callous area close to the dorsal margin and not set off from the chondrophore by any shelly ridge; ."(Dall)

Grant and Gale, 1931 as wellas many others consider Spisula a subgenus of Mactra. Mr. George Willett states their position very concidely " It is easy to say that a little shelly ridge differentiates Mactra from Spisula particularly if you take the other fellow's word for it and do not try to find it for yourself. Sometimes you find it, sometimes you don't".

It is true that this little shelly ridge is easily broken off and not infrequently is lost causing a puzzle. However, it seems to be constant in fresh and well preserved specimens.

Subgenus Hemimactra Swainson,1840. Type Mactra gigantea Lamarck = Mactra solidissima Dillwyn. Dall placed most of our west coast species of Spisula under this subgenus. Grant and Gale, 1931, p. 394 state that " Swainson characterized Hemimactra as being of the general form of Mactra; but the cardinal teeth entirely wanting." For this reason they abandoned its use. However, Dr. A. Myra Keen (Per. Comm. Dec. 1944) remarks " The fact that Swainson was in error as to the presence of cardinal teeth does not invalidate the genus or subgenus. Our concept must be based on a study of the species which Swainson cites. However, none of our west coast species that I have seen seem to have the grooved anterior laterals of solidissima; perhaps Hemimactra should be abandoned on that ground.

Section Mactromeris Conrad,1868. Type (by subsequent designation Dall, 1898), M. polynyma Stimpson.

" Shell of moderate or large size, ovate, subtrigonal; beaks more anterior than in Spisula s.s.; hinge with relatively small, short laterals, an ample chondrophore, and cardinal teeth often small but well formed."

Spisula polynyma alaskana Dall, 1894. " Arctic Ocean at Cape Lisburne, south to Bering Sea and the Aleutians and eastward to Puget Sound (Dall, 1921); north Japan, the Kurile Islands and the Okhotsk Sea (Schrenck).

Two questions of taxonomy are involved here. In the first place is the variety separable from the typical Spisula polynyma (Stimpson),1860 (Checklist East Coast Shells; Smithsonian Misc. Coll. vol.2, Art.6, no.3, p.3,1860) (new name for M. ovalis Gould). Johnson gives the range of the typical from Hudson Bay to Cape Ann and Georges Bank, Mass. In Nautilus, vol.7,p. 138 Dr. Dall named the variety alaskana as follows: The northern form generally referred to M. falcata is a barely separable variety of M. polynyma which may take the name of alaskana." The variety is said to be "less elongate than the typical". Perhaps they are. I have on my table at this time a set from off the coast of Massachusetts (20 mi. N. of Thatchers Buoy), and also a set sent me by W.J. Eyerdam from Unalaska, Aleutian Islands. They are very close but we will retain the west coast name.

However, if we are going to use the varietal name at all, there seems to be an argument there. Grant and Gale, 1931, p. 395 state that " It appears quite certain that variety alaskana Dall and voyi (Gabb) are identical ". If this is to be accepted the name would therefore be Callista voyi Gabb, Geol. Surv. Calif. Palaeo., vol.2, p. 24, pl.5, fig. 41,1866 as the varietal name with alaskana Dall,1894 in the synonymy. The name would then be Spisula polynyma voyi (Gabb),1866. Dr. A. Myra Keen has accepted voyi in the ' Abridged Check List'. However, the type locality of voyi is Miocene or Pliocene near Humboldt Bay below Bear River, Humboldt Co. and it seems that the burden of proof should be definitely upon those who wish to establish a Recent name with a Miocene name.

Collecting data: Reported from S. E. Alaska to Swikshak, Alaska Penninsula by Mr. George Willett with the comment " Apparently smoother and t thinner than polynyma"; Wachusetts Bay, Admiralty Id., S.E. Alaska,1918; Izhut Bay, Afognak Id., 1922; Cordova and Sitkalidak Id., 1931; Unalaska Id. 1932; and Raspberry Id., Kodiak Group, 1939 (W.J. Eyerdam) with the additional comment " This species does not seem to be common at any place". Chichagof Id. and Admiralty Ids. (Stephens)/

(see figures on p. 10).

Spisula hemphillii (Dall), 1894. Redondo Beach, Calif. (Burch) to Corinto, Nicaragua (Eyerdam). Type locality, San Diego, Calif.

Obviously after the dolabriformis discussion the status of this species is questionable. However, it is easily recognized and not uncommon. Grant and Gale, 1931, p. 398 state of this " This large Mactra differs from catilliformis in the long anterior portion of the shell, which is concave in profile along a dorsal margin. The hinge is of the same type as that of catilliformis , but the laterals are a little longer. Also, the pallial sinus of hemphillii is more inclined upward ."

(See figures on page 11)

Collecting data: Our experience has been to find this a comparatively common beach shell all the way from Long Beach, Calif. to the beaches below Ensenada,Mexico. Good living specimens are exceedingly rare but are occasionally washed in after heavy blows. We have taken half grown specimens living in Alamitos Bay and other lagoons but have never seen one of the huge adults other than from the open sea. The normal habitat of this species seems to be off shore in comparatively shallow water. However, we have dredged it fromas deep as 25 fms. off Redondo Beach, Calif (Burch); Corinto, Nicauragua (W.J. Eyerdam) with the additional comment " Specimens identified from U.S. National Museum are identical with specimens from Burch collected at Ensenada, Mexico. This is an extension of range of over 1,000 miles." Reported from San Pedro and Long Beach by the San Diego Museum.

Spisula catilliformis Conrad,1867. " Neah Bay to San Diego, Calif." (Dall).

The questions involved in this specific name are well stated by Mr. A.M. Strong (Per. Comm. Dec. 1944), as follows:

" This was described in Am. Jr. Conch., vol.3, 1867, p. 193. It was figured in Am. Jr. Conch. vol.5, pl. 13, fig.1 (p. 108). The type locality is given as Panama. This figure seems to have been entirely overlooked as I find no reference to it. Dall redescribed the species in Nautilus, vol.7, p. 137 and states that nothing like it is known from Panama and the description would fit California shells. He states that it is M. californica of Carpenter but not of Conrad. The fig. given by Dall is pl. 5, fig.3 which I do not have.

Oldroyd figured a shell, pl. 24, from the University of California, quite different from that in the Jr. of Conch. She copies Dall's description, not Conrad's as stated. Grant and Gale figure a shell from the fossil of San Diego which seems to agree with neither of the above figures.

Packard figures a shell in Bull. Dept. Geol. Univ. Calif. vol.9, p. 285 pl.17,18,19. These should be compared.

A numver of Mactra have been described from Panama and vicinity since Dall's time so his statement that nothing like it is known from Panama is open to question.

The next question is what Spisula californica Carpenter is like. On page 613 of the Suppl. Rept., 1863, he states " Conrad's types being lost, and his descriptions from very young specimens, a difficulty attends their identification. Dr. Cooper found very large valves (resembling Schizothaerus) in abundance, but much deformed by the entrance of sand, and apparently killed by fresh water by a great flood. The larger shells belong to two very distinct species, which are probably those of Conrad. On p. 640 he lists S. californica Conrad (Not Deshayes) , large, shaped like Schizothaerus nuttalli but beaks narrow. This is all the description I can find.

The shell we know as Spisula catilliformis is S. californica Carpenter (not Conrad) and all our descriptions and figures are based on Carpenter's identifications. Applying S. catilliformis Conrad to this shell is open to question. If the name can not be so used ,our shell is without a name. The main trouble seems to have come from the fact that Conrad's figure, published two or three years after the description has been overlooked."

However, it is the opinion of the group that the shells we are labelling catilliformis fit Conrad's figure in all respects. Check the figures on page 9 for our shell with the figure on page 15 for Conrad's original figure and on page 16 with a tracing of Dall's figure. In my opinion they are clearly identical.

Collecting data: Our experience has been to find this a comparatively rare species. We have picked up occasional valves washed in on the beaches at a number of localities from Oceano, San Luis Obispo Co. southward. It is not an uncommon shell from Long Beach south to Huntington Beach although good complete specimens are quite rare. We have taken half grown specimens living in Alamitos Bay but like similar specimens of hemphillii, they have not been of the huge size attained in the open sea. (Burch). Reported from Long Beach, San Quintin Bay, and Ensenada, Lower Calif. in the Lowe collection in the San Diego Museum.

Spisula falcata (Gould), 1850. Puget Sound to Cortez Banks and the Coronado Islands (Dall). Type locality, Puget Sound.

Grant and Gale, 1931 were disposed to give the range as " Queen Charlotte Islands and Puget Sound, possibly as far south as Cape Mendocino but more southerly reports probably erroneous." This opinion has been rather prevalent because it simply did not seem reasonable that the small shells we call falcata in southern California could be the same thing Gould described being 3 3/4 inches long. None of the southern shells remotely approach that for size. There are some excellent figures of falcata reproduced in Oldroyd, pl.20, figs 1,2,3.

Collecting data: Our experience has been to find this a comparatively common off shore species with a bathymetric range down to around 20 fms. preferring sand bottom. In southern California they seldom exceed an inch in length. We have dredged it from Monterey south to Ensenada.(Burch); Alki Point, Seattle, Wash. (Eyerdam); Coronado Beach (Emery); San Diego, Calif. (Lowe).

(See figures on p. 12)

Subgenus Symmorphomactra Dall,1894. Dr. Dall in 1894 placed falcata under this subgenus. In 1921 in Bull. 112 he only places planulata under it. Described as having " Teeth of Mactrotoma s.s.; hinge of Spisula" The opinion of the majority of the members is that the subgeneric distinctions are too small to describe. Therefore, we shall not use them.

Spisula planulata (Conrad), 1837. Monterey, Calif. to Cape San Lucas, Lower Calif.,(Dall). Type locality, near Santa Barbara, Calif.

(See figures on page 13)

The problems connected with this specific name are stated by Mr. A.M. Strong(Per. Comm. Dec. 1944) as follows: Spisula planulata (Conrad)- " This is one of two species collected at Santa Barbara by Nuttall and briefly described by Conrad in Jr. Acad. Nat. Sci. Phila. vol.7, p. 240. Carpenter reviews this paper, Rept. 1863, and says; " The work bears the appearance of undue haste---- the descriptions being in English would not have been entitled to claim of precedence were it not that they were accompanied by tolerably recognizable figures." This particular species does not seem to have been figured.

Carpenter applied the name to specimens collected at Santa Barbara by Cooper, Rept. 1863, pp. 613,640, but is not certain about it. Packard, vol.9, p. 293, says that it is not of Cooper and Carpenter. Oldroyd figured in Univ. Wash. Pull. Puget Sound Biol. Sta. p. 60, pl. 17, figs.4-6, is stated by Grant and Gale to be a reproduction of Packards illustration of M. californica.

Dall in Bull. 112, pl. 3, fig.9, figures a specimen under this name but does not state where it came from. It evidently was drawn from a shell in the collection and he generally followed Carpenter's identifications.

In spite of the many references in the literature no one seems able to state definitely what shell should take the name and the type is said to be lost.

Collecting data: San Pedro, Calif. (G. Willett); Morro Bay and San Pedro (Dr. H.R. Hill); San Diego, Long Beach (San Diego Museum); Morro Bay, Newport Bay, Anaheim Bay, Huntington Beach, Calif. and Todos Santos Bay (Burch).

Genus Schizothaerus Conrad, 1853. Type (by monotypy), Schizothaerus nuttallii (Conrad).

" Shell ovate, oblong, ventricose, hinder gape roundish; hinge with the cardinal teeth small, lateral teeth very small, close to the cardinals; ligament external, marginal, separated from the cartilage-pit by a shelly plate." (Gray's description of Tresus) (Grant and Gale).

Schizothaerus nuttallii (Conrad), 1837. Bolinas, Calif. to Scammon's Lagoon, Lower Calif. Type locality, near Santa Barbara, Calif.

The range of this species is somewhat confused by the fact that many correspondents seem to have the typical reported instead of the variety capax. Dr. A. Myra Keen (Per. Comm. Dec. 1944) states the situation as follows: " Eric Jordan collected Schizothaerus nuttallii at Scammon's Lagoon, L.C. We have specimens from as far northas Bolinas, Calif. North of that all the specimens I have seen are the short, high form with the arched ventral margin-- S. capax. S. capax ranges from Monterey north to Kodiak Island. Although the ranges of the forms overlap, I have seen no specimens that could be said to be intergrades, so I regard them as separate species ."

You will find on this page a tracing on the top half of anactual specimen of S. capax from Puget Sound. Below it is a tracing of a specimen of typical S. nuttallii from Alamitos Bay, Calif. The difference in shape is apparent.

However, this seems to be a mooted question. Mr. W.J. Eyerdam reports S. nuttallii as follows :" Very common on most sandy mud beaches on Puget Sound at low tide mark. Said to attain a length of 9 inches in record specimens, The largest in my collection is L. 180 mm- H. 120 mm. Reported from Craig, Alaska (George Willett); Alsaka to San Quintin Bay and Fukikon Japan (Dr. Fred Baker collection).

This species is unmistakable other than that perhaps the very young are occasionally puzzling. However, they take on the typical form when quite small. The long siphons connect the shell with the surface of the mud or sand. It usually requires a hole 2 ft. or so in depth to get a good specimen. It is a common species in all southern California lagoons, Alamitos, Anaheim, Newport, Mission etc. It is very abundant in Morro Baym San Luis Obispo Co. ., And we have dredged living young and dead valves off Monterey in 20 fms. and off Redondo Beach in as deep as 25 fms. off Santa Monica in 20 fms. (Burch).

Schizothaerus nuttallii capax (Gould), 1850. Kodiak Island, to Monterey. This is the short, high, globose form common in Puget Sound.

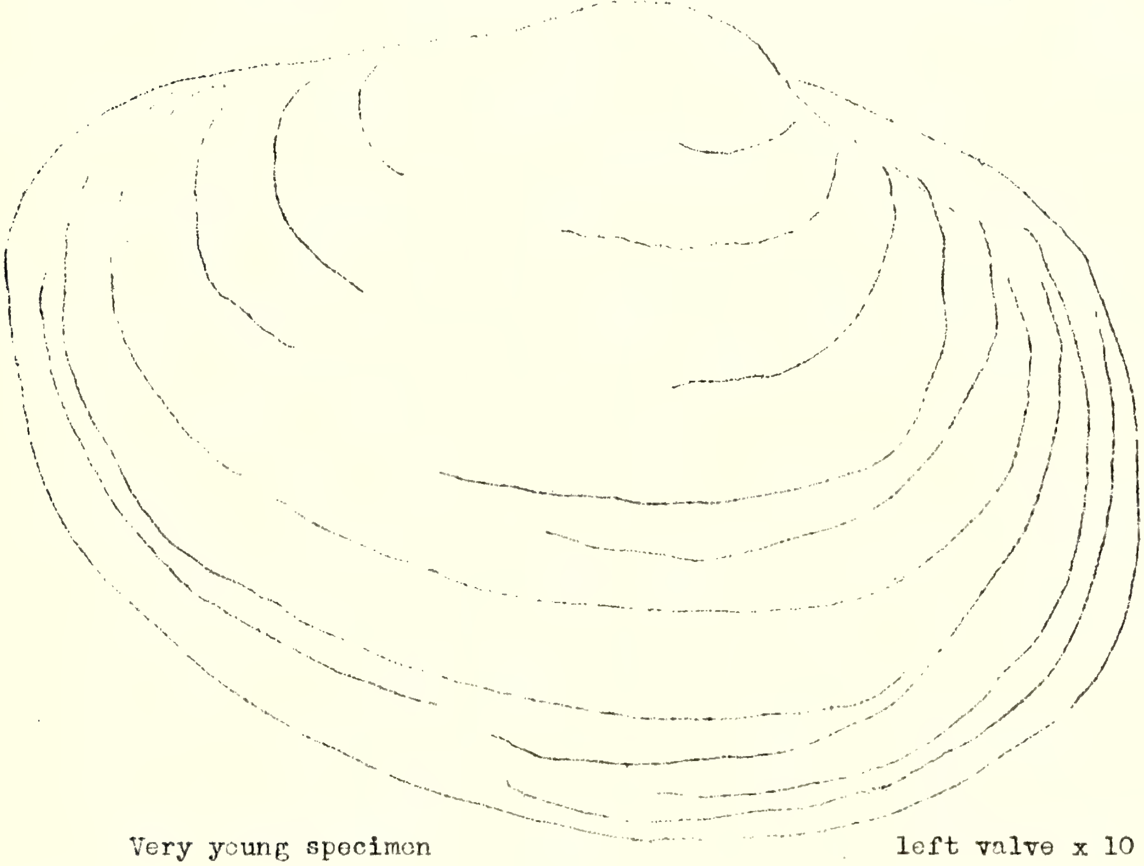
Collecting data: Port Orchard, Wash. (Burch); Tacoma, Wash. and Dall Id., Alaska (G. Willett); Sitkalidak Id., and Three Sts. Bay, Kodiak Id., Alaska, 1931 (W.J. Eyerdam) who comments " Much wider and more round shell than typical and is less common" " My largest specimens are from Sitkalidak Id and are L. 175 mm. - H. 150 mm.

The following note from Thomas A. Burch " Just finished drawing the young specimens of S. nuttallii (see p. 23)that we collected off the bait tank among the Bryozoa at Santa Monica in 12/35/. Since they had everyone puzzled I think we should have them in. Incidentally,I think that the date these were collected should be emphasized since it indicates that S. nuttallii spawns during December."

Schizothaerus nuttallii Conrad,1837
Santa Monica, Calif. 12/1935
Bait tank in Bryozoa.

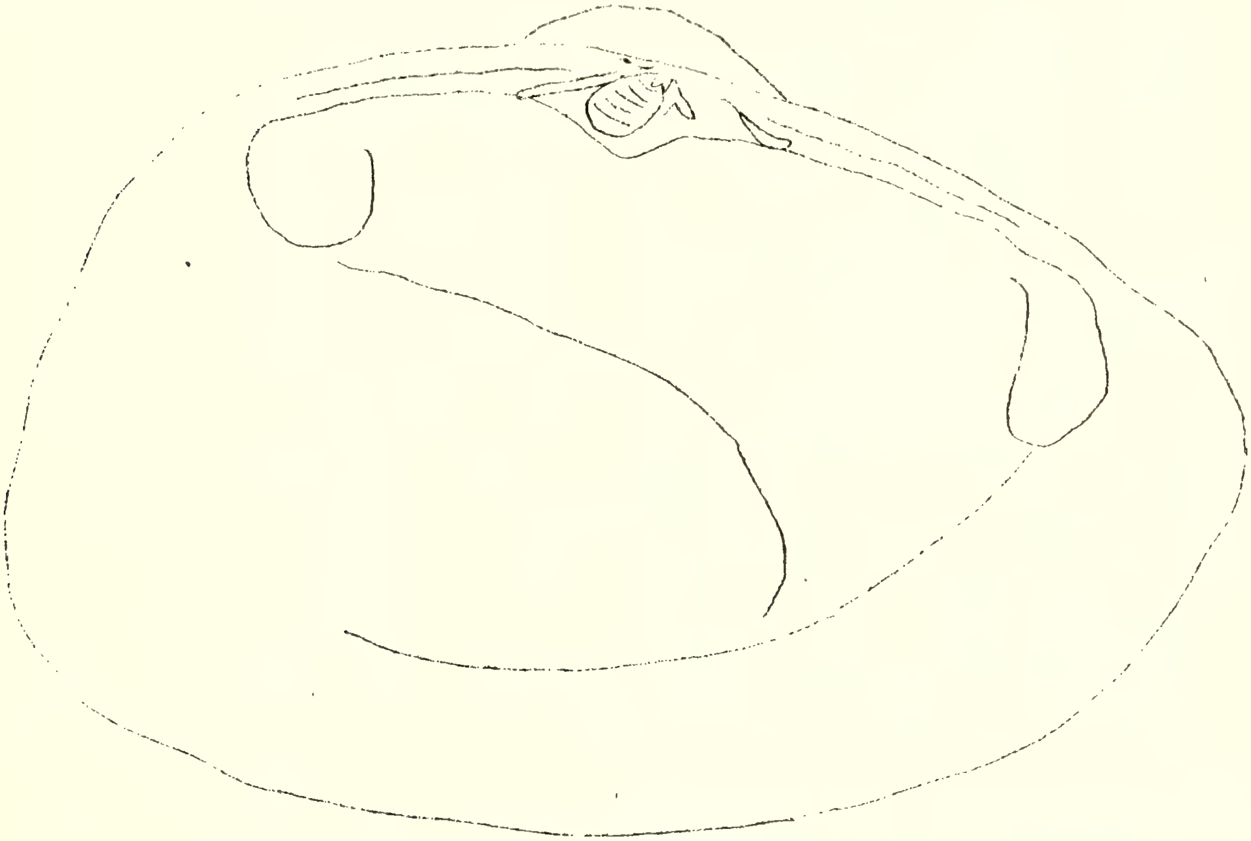
#44 p 23

M S 458



Very young specimen

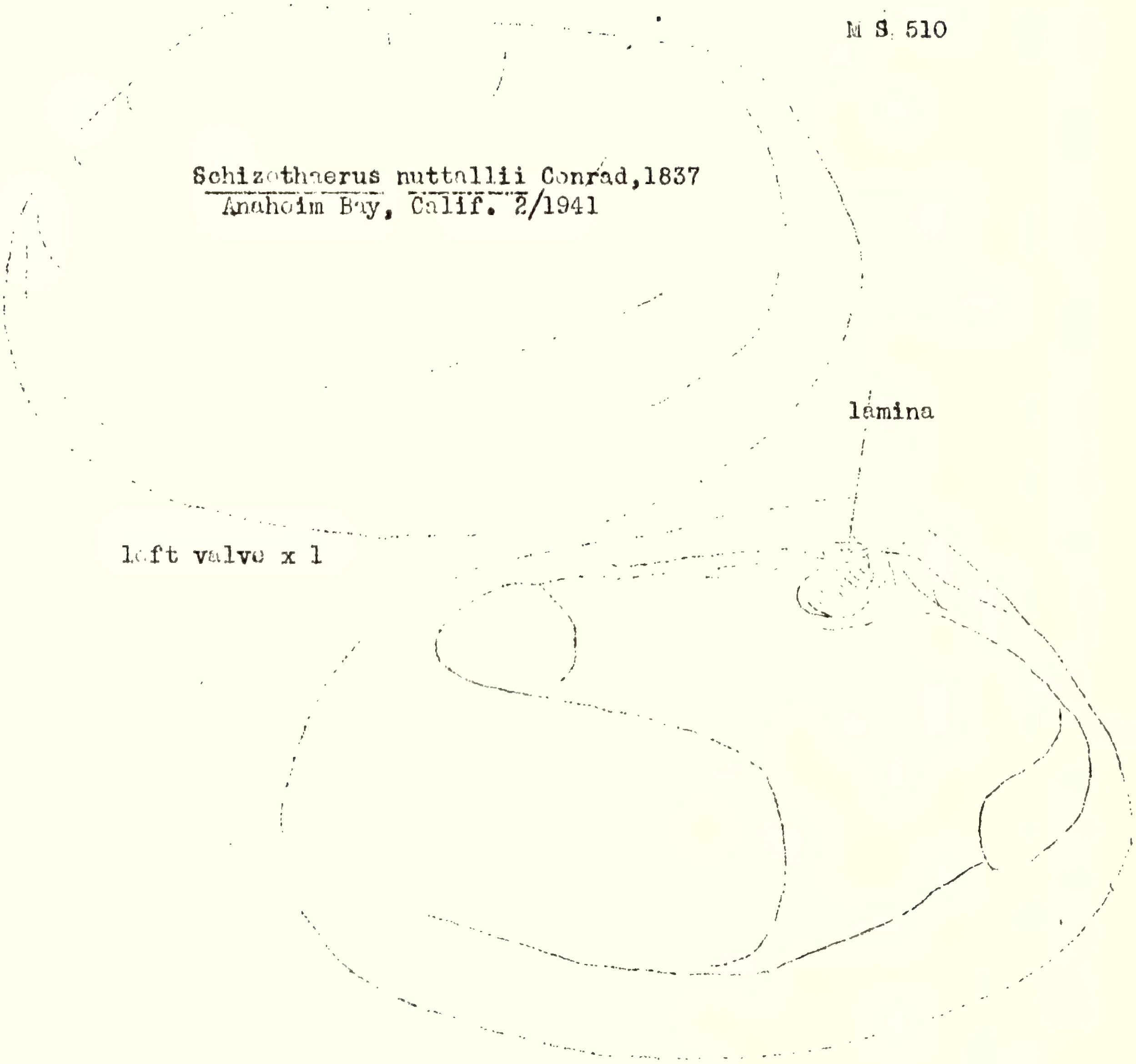
left valve x 10



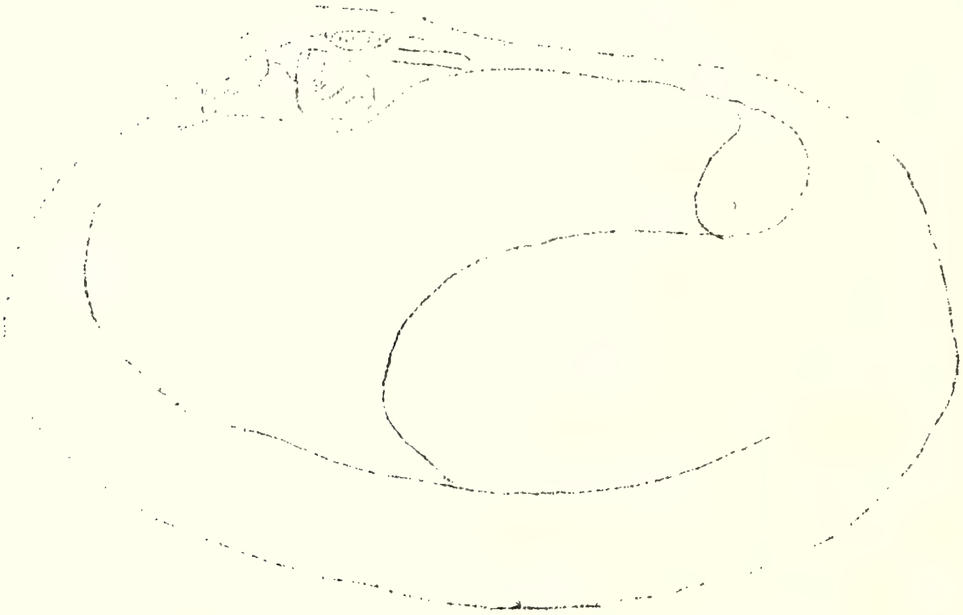
#44 p 24

M S 510

Schizothaerus nuttallii Conrad,1837
Anaheim Bay, Calif. 2/1941



left valve x 1



right valve x 1

The following note from Thomas A. Burch is of interest in connection with the figures on pages 23 and p 24 " As I hope you can tell from the drawings, the chondrophore is separated from the ligament area by a lamina as in Mactra. The hinge is practically identical with that os Mactra californica. In fact, if it was'nt for the radically different shaped shell I would think them the same genus".

Family MESODESMATIDAE
Genus Ervilia Turton,1822. Type (by monotypy), Mya nitens Montagu.

" Shell minute, oval, close; cartilage in a central pit; right valve with a single prominent tooth in front and obscure tooth behind; left valve with two obscure teeth; pallial sinus deep." (Tryon S.S. Conch.)
Ervilia californica Dall, 1916. " San Pedro, Calif. to Magdalena Bay" (Dall) Type locality, San Pedro, Calif. The holotype is figures in the Key to Pelecypod Genera by Keenand Frizzell.

Family MYACIDAE
Genus Mya Linnaeus, 1758. Type (by subsequent designation, Children,1822) Mya truncata L.

" Shell oblong, inequivalve, gaping at the ends; left valve smallest, with a large flattened cartilage-process; pallial sinus large" (Tryon).
Mya truncata Linnaeus,1758. " Circumboreal. Arctic Ocean to Bering Island on the westand to Puget Sound on the east" (Dall, 1921). Johnson gives the Atlantic range as " Greenland to Massachusetts".

Johnson also lists a subspecies Mya truncata uddevallensis Forbes,1846. Grant and Gale, 1931 discuss this on page 415.

" This species is usually smaller and more irregular than arenaria , and can be distinguished by its truncated posterior end and its differently shaped chondrophore." (Grant and Gale, p. 415).

Collecting data: Tacoma, Wash.; Ketchikan,Craig,Chignik, Alaska; (G. Willett); Victoria, B.C. (Lewis); Puget Sound, British Columbia, and Admiralty Ids. (Stephens); Fauntleroy Cove, Seattle and Strait of Fuca, Wash.; Izhut Bay, Afognak Id., Raspberry Id., Kodiak Id., Sitkalidak Id., Knight Id., Mitrofania Id., Unimak Id, Akutan Id., Unalaska Id., and Atka Id. (W.J. Eyerdam); also Tromso Fjord, Norway (I. Norberg); and coast of Maine (N. Lermond);
Mya truncata uddevallensis Forbes,1846. This subspecies is added on the records of our member W.J. Eyerdam who reports as follows :
" Izhut Bay, Afognak Id., and Raspberry Id., Alaska collected by W.J. Eyerdam. I have specimens from the type locality, Kapellbackarno, Udevalla, west coast of Sweden that correspond closely to the specimens from Izhut Bay. This is a very truncated variety which is quite distinct from the typical. It is also found on the east coast of Canada. This variety seems to be quite rare on our coast and does not seem to have been previously reported perhaps because type specimens were not available for comparison. Add this variety to the list of west coast shells".
Mya japonica Jay,1857. (Mya intermedia Dall,1898). " Arctic Ocean to Japan and to Monterey, California: probably also Atlantic" (Grant and Gale, 1931).

Dr. A. Myra Keen advises (Per. Comm. Dec. 1944) " Mya intermedia Dall is a homonym, so that if the form is to be distinguished from arenaria the name japonica must be used or a new name proposed. So far I have not reached a decision on the matter, though I have reviewed the problem several times."

Grant and Gale, 1931, p 415 consider japnnica a subspecies of arenaria. They also state though " The form japonica is distinguished from typical arenaria by its somewhat shorter, coarser,rougher shell. It is intermediate to between arenaria and truncata." Mr. George Willett states " Shape much like arenaria but blunter anteriorly; surface rough like truncata."

Collecting data: Chignik, Unimak, Unalaska (G. Willett); Nunivak Id. (Lewis); Muddy Beach, Alaska (Lowe); Japan (Lowe and Anderson collections) Kiitap, hokkaido, Japan (Dr. F. Baker Coll.); W.J. Eyerdam reports as follows : " Drier Bay, Knight Id., Sitkalidak Id.; Izhut Bay, Red Fox Bay, and Shuyak Strait, Afognak Id., Mitrofania Id., Unalaska Id., Atka Id., Alaska and Avatcha Bayand Gulf of Kronstski, Kamchatka.. coll. by W.J. Eyerdam. Most of the specimens that I have seen approach nearer to some forms of Mya truncata but are in the adult phase correspondingly much larger and are much heavier or solid than arenaria. There arealso distinct differences inthe sinus and hinges in adult specimens. When I was at Petropavlovsk on Avatcha Bay in 1928 I often dug these fine clams for a meal and when they were cooked the Russians were glad to eat them but even tho many of them were half starved I never saw any of them digging these clams although the beds were in easy access and no effort required to dig them. I just figured that these Russians were too lazy to even try to keep from starvation when there was plenty of food at hand, as there were plenty of fish in the bay and millions of birds on the water and nesting on the cliffs, I never saw any of them even attempt to fish at that time. Whenever a Jap ship was in, the crew was out on the beach eagerly digging clams."

Mya arenaria Linnaeus, 1758. " Britain, Scandanavia, Greenland, Atlantic Coast of North America to Carolina, Alaska south to Japan and to Vancouver Island, British Columbia (found in Indian mounds on Vancouver Island - fide Oldroyd), artificially introduced about 1865 from the Atlantic coast with seed oysters into San Francisco Bay whence it has spread along the California and Oregon coasts." (Grant and Gale, p. 412).

Dr. A. Myra Keen advises about the species as follows " According to Don Frizzell, there is question as to the occurrence of Mya arenaria in the Indian mounds on Vancouver Island. Where Mrs. Oldroyd ran across the statement is something of a puzzle; at least, I haven't found the original source. The distribution of this group would make a nice problem for some one."

Collecting data: This clam is common on many sandy beaches of Puget Sound. When was it first introduced into this region or is it native? (W.J. Eyerdam); Empire, Oregon; Sinslau R., Florence, Oregon; San Juan Ids., San Francisco Bay: (San Diego Museum coll.); perhaps the easiest way to get a large set of this species is to buy a pound or two at Fisherman's Wharf, San Francisco, or other market.(Burch).

Genus Cryptomya Conrad, 1849. Type (by monotypy), Sphenia californica Conrad.

" Like a small Mya but without the long protruding siphons and consequently with but a slight posterior gape and the pallial sinus obsolete or very short; shell small, ovate, not very convex; chondrophore similar to that of Mya arenaria; interior of dorsal margins thickened." (Grant and Gale). Some authors consider Cryptomya a subgenus of Mya.

G.E. MacGinitie, " Ecological Aspects of a Calif. Marine Estuary", The American Midland Naturalist, vol. 16, p. 730, Sept. 1935 gives a good account of the habits of this species and the reason it can live so deep with such short siphons. It is taken as deepas 20 inches. The siphons protrude into the burrows of such forms as Upogebia,Urechis, and Callianassa .

Cryptomya californica (Conrad), 1837. " Chicagoff Island, Alaska and south to Topolobampo, Mexico" (Dall). Grant and Gale add, probably also Japan. Type locality, Santa Barbara, Calif.

Dr. A. Myra Keen calls attention to an interesting point " The description of Cryptomya californica in Oldroyd is incorrect; actually it is the original description of Cumingia californica."

Collecting data: An interesting note on our experience with Cryptomya is that we have picked up dead valves in our dredgings from deeper than 50 fathoms off Redondo Beach, Calif. Valves were not uncommon off Monterey in 10 to 15 fms. We have found the species abundant in all bays and lagoons. It forms a definite stratum along the edges of the lagoon at Mugu, Ventura Co. with the Heterodonax above it and other forms below it. But we have also found it living all along the open coast having taken it at Dana Point, La Jolla etc. (Burch); Vancouver, B.C. (Eyerdam); Dall Id. and Craig, Alaska (G. Willett).

Genus Sphenia Turton, 1822. Type (by subsequent designation, Gray,1847) Sphenia binghami Turton.

" Shell like that of a small Mya, very thin, irregular in shape, the chondrophore small, thin, oblique, practically characterless." (Grant and Gale, p. 419).

Sphenia fragilis Carpenter, 1857. " Oregon to Mazatlan, Mexico" (Dall,1921) Type locality, Mazatlan.

Collecting data: San Pedro, Calif. in 15 fms. (G. Willett); Ensenada, L.C. in 15 fms. (Burch)

Sphenia ovoidea Carpenter,1864. " Aleutian Islands to Puget Sound and San Diego " (Dall). Type locality, Puget Sound.

Collecting data: Craig, Alaska (G. Willett) ; Port Armstrong, Baranof Id., Alaska in kelp holdfast (W.J. Eyerdam); we have specimens taken off Friday Harbor, Wash. by Trevor Kincaid (Burch)

Sphenia trunculus Dall, 1916. " San Diego, Calif. to Panama" (Dall). Type locality, San Diego. Mr. George Willett suggests that both trunculus and the following species pholadidea may be but situs forms of fragilis.

Sphenia pholadidea Dall, 1916 " Santa Barbara, Calif. " (Dall) and off Monterey, Calif. (Burch). Type locality, Santa Barbara. to Baulinas Bay.

Dr. A. Myra Keen is of the opinion that the following should be in the synonymy of this species; Sphenia globula Dall, 1919 ; Sphenia nana (Oldroyd),1918, which was described as Cuspidaria nana Oldroyd but is really a Sphenia.

Collecting data: Dredged off Monterey in 1937 and also in 1940 from a 20 fathoms station and also a 35 fathom station (Burch); San Pedro, Calif. in 15 fms. (G. Willett); Mission Beach (Orjala); Imperial Beach (Randall).

The last reports change the range of this species from the above to Bolinas Bay to Imperial Beach, San Diego Co.

Genus Platyodon Conrad, 1837. Type (by monotypy), Mya (Platyodon) cancellata Conrad.

" Shell like that of the typical subgenus but with a smaller chondrophore, an d sculptured with concentric ridges formed by emphasizing the growth lines; animal with armor at the end of the siphons as in Mya truncata. " (Grant and Gale).

Platyodon cancellatus (Conrad), 1837. Queen Charlotte Is. to San Diego, Calif. Type locality, near Santa Barbara.

Dr. A. Myra Keen (Per. Comm., Dec. 1944) " A couple of years a go D.B. Quayle of the Pacific Biological Station, Nanaimo, B.C. sent us 3 specimens of Platyodon cancellatusthat he had taken alive at Tlell, East Coast of Graham I., Queen Charlotte Is., which extends the range to 54 degrees N.

Collecting data: G.E. MacGinitie, Am. Mid. Nat. vol.16, 1935 states " A Platyodon burrow may be distinguished from a Zirfaea burrow because the hole around the siphon of the former is always sandy, whereas around that of Zirfaea it is clayey". Our experience has been to find this species in close proximity to beds of Pholads. We found it abundant around

Terminal Island, Point Firmin, and the banks at the entrance at Anaheim Landing, Calif. (Burch);Clallam Bay, Strait of Juan de Fuca, Wash. (Eyer-dam) 1925.; Point Loma, Mission Bay, Alamitos Bay, Duxbury Reef (San Diego Museum).

Family ALOIDIDAE (CORBULIDAE)

The theory is that Aloidis Megerle von Muhlfeldt, 1811 must replace Corbula Lamarck,1799 being preoccupied by Corbula Rodina,1798 for a different group. The above from Cotton and Godfrey, Molls. of S. Australia, p. 281,1938 , but followed also by Dr. A. Myra Keen in " Abridged Check List". Grant and Gale, 1931 continue with Corbula Bruguiere,1797. Dr. A. Myra Keen (Per. Comm. Dec. 1944) states the question " The Corbula problem is similar to the Lucina problem, the name having first been used by Bruguiere in 1797 at the head of a plate, with no named species. Before it was validated by Lamarck in 1799, Roding used the name for a species of Asaphis. Whether Corbula can be considered a genus without species is a question that must be submitted to the International Commission. Meanwhile either we must talk about " Corbula" or adopt the next available name, Aloidis. The latter course seems preferable to me."

Genus Aloidis Megerle von Muhlfeldt,1811. Type (by monotypy), Corbula sulcata Lamarck -- (Corbula guineensis Muhlfeldt).

Dr. Julia Gardner of the U.S. Geological Survey in Nautilus vol. 40, pp 43-44 has a detailed discussion in her article " The Nomenclature of the Superspecific Groups of Corbula in the Lower Miocene of Florida". Dr. Gardner states that the type of Aloidis, Corbula sulcata Lamarck, a Recent shell from the coast of Senegal, is such a different shell when compared to species of Corbula or those we know as Corbula as to make it distinct. Dall, Trans. Wagner Free Inst. vol.3, pt.4, pp. 836-56,1898, discusses Aloidis and uses it as a Section of Corbula s.s. distinguishing it as follows: " Like Corbula, but with strong concentric sculpture and keeled rostrum."

There is a difference of opinion on this matter as indicated above. However, it seems that the majority are in favor of the use of Aloidis until further notice.

Subgenus Lentidium Cristofori and Jan., 1832. Type (by subsequent desig. Dall,1898), Lentidium maculatum Cristofori and Jan. -- Corbula mediterranea (Costa). fide Grant and Gale, 1931 , p. 421.

" Shell nearly equivalve, elongate trapezoidal, with concentric sculpture on both valves, often rather feeble; ligament sometimes visable externally in a fissure near the umbo."

Aloidis obesa (Hinds), 1843. " Catalina, Calif. to Panama" (Dall).

Dr. A.M. Keen advises " The type locality of "C" obesa is Panama, Coast of Veragua, and San Blas, or latitudes 8) 57' to 21 32'."

Aloidis fragilis (Hinds), 1843. " Monterey to Salina Cruz, Mexico"(Dall). The type locality is West Coast of Veragua, Panama.

Collecting data: Mazatlan, Mexico (Strong).

This species is said to be larger than luteola, thinner shelled, and with more prominent concentric sculpture.

Aloidis luteola (Carpenter), 1864. " Monterey, Calif. to Acapulco, Mexico (Jordan,1924) (Grant and Gale). Type locality, San Pedro and San Diego.

A subspecies C. luteola rosea Williamson,1905 (Proc. So. Calif. Acad. Sci. 4:120) has been generally placed in the synonymy. Grant and Gale state " Pinkish or rosy-colored individuals occur indiscriminately asso-

-iated with the yellow form" and this has been our experience especially with dredged specimens.

Collecting data: Our experience in littoral collecting has been to find this species associated with rocky rubble. It is common in certain localities and rather rare in others. We found it abundant at Dana Point, San Onofre, Bird Rock below La Jolla, the rocky rubble north of Ensenada etc. And in more or less the same type of material we found it not uncommon in the dredgings from off Redondo Beach, Calif. in as deep as 25 fms. and off Ensenada, Mexico in Todos Santos Bay in about 15 fms. This is the only species we have ever beenable to recognize in our material.

Aloidis porcellia (Dall), 1916. " Santa Rosa Island to Panama" (Dall). Type locality, off Lower Calif. in 44 fms.

Aloidis kelseyi (Dall),1916. " Esteros Bay to Catalina Island, Calif." (Dall). Type locality, Catalina Island, Calif.

Genus Grippina Dall,1912. Type, Grippina californica Dall.

" Shell slightly inequivalve, donaciform, small, with a well-marked rounded, ascending pallial sinus; right valve receiving the dorsal edge of the left in grooves beneath its own dorsal margins; cardinal teeth two,large,sub-equal, prominent, horizontally produced and fitting under the beak of the left valve; resilium strong, compressed, situated between the two cardinals attached under the beak of the left valve,and having on its ventral surface a thin calcareous coating or ossiculum."

Grippina californica Dall, 1912. San Diego, Calif. to Guadeloupe Id. Type locality, off San Diego, Calif. Strong and Hanna reported the species from Guadeloupe Island.

Family SAXICAVIDAE

Some of the more recent authors have been using the family name HIATELLIDAE having accepted the generic name Hiatella Daudin,1801 and placing Saxicava Fleuriau de Bellevue,1802 in synonymy. Among those following this proceedure are, Cotton and Godfrey," Molls. of S. Aust.", 1938, Powell of New Zealand, Dr. Maxwell Smith in his recent World Wide Sea Shells etc. However, the majority of references continue to use the time honored name of Saxicava. It must be admitted that the advocates of Hiatella seem to make a rather strong case. Dr. A. Myra Keen (Per. Comm. Dec. 1944) states " Kennard, Salisbury and Woodward in " The types of Lamarck's genera of shells as selected by J.G. Children in 1823", Smith. Misc. Coll., vol. 82, no. 17, 1931 say, regarding Hiatella: " H. arctica (Mya arctica L.) , sole species quoted by Lamarck, who admits he was unacquainted with the genus, and certainly not one of Daudin's indeterminable two". I take it, therefore, that we may regard Hiatella as a genus dubium and continue to use Saxicava."

Genus Panope Menard,1807. Type (virtually by monotypy, designated by Fleming,1818, as Panope faujas Menard -- Mya glycymeris Born. fide A.M. Keen. Grant and Gale give Children's designation,1823 of P. aldrovandi Menard.

" Shell equivalve, thick, oblong, gaping at each end; ligament external, on prominent ridges; one prominent tooth in each valve; pallial sinus deep." (Tryon S.S. Conch.).

Panope generosa Gould,1850. Forrester Island, Alaska (Willett) to Scammons Lagoon, Lower Calif. (Jordan); also Gulf of California; Japan. Type locality, Puget Sound.

The subspecies P. generosa solida Dall,1898, type locality San Francisco seems to be another variety based on slight differences in shape and has been generally placed in the synonymy of the typical. Dr. A.M. Keen

(Per. Comm. Dec. 1944) " As regards the subspecies proposed by Dall: I believe you are correct in disregarding them. Mrs. Oldroyd's description for P. g. solida is incorrect, as she accidentally ran instead the description of P. g. globosa, the type locality, of which is head of the Gulf of California. The type locality of solida is San Francisco. The illustration she gives has me baffled. It is obviously reduced, but if it were magnified to the stated height of globosa (120 mm.), the shell would be 22 mm. longer; than globosa; if magnified to the height of solida (97 mm. it would be 30 mm shorter than solida; if to the stated typical size of generosa (110 mm) it would be 14 mm. shorter. The proportions of this illustration seem closer to what Dall says are typical (Trans. Wagner. Inst. vol.3, p. 831) than to either of the subspecies he describes. Possibly the shell was tilted in photographing and the figure distorted. In other words the figure given as solida is of a shell proportionately shorter than solida and longer than globosa; it is nearer what Dall says is typical generosa but is slightly shorter. The photograph was supplied by the National Museum I think. Study of the type specimen is obviously necessary."

Collecting data: All who have dug this species out will appreciate the reason why comparatively few of them are sent carelessly in exchanges. They are not rare but the habitat is often a full yard below the surface of the mud and to add to the difficulty it usually selects locations having such a loose nature that the hole fills as rapidly as dug.

According to MacGinitie the siphons of this species constitute at least ½ the entire weight of the clam shell included.

Our experience has been to find it very abundant in Morro Bay, San Luis Obispo Co. and in most of the bays and lagoons south to Newport Bay. It is not uncommon at Mugu, Ventura Co.

An interesting note on this species is the fact that in places while dredging off Redondo Beach on the gravel beds ranging between 20 and 25 fms . we would occasionally bring up dredge hauls composed almost entirely of well preserved dead valves of this species. They seem to be in colonies and when we hit them we simply picked our other specimens out of a bushel or more of Panope valves. It is not uncommon in some of the Pleistocene deposits such as Timm's Pt. (Burch).

Reported from Budd Inlet, Mason Co., and Port Orchard, Wash by W.J. Eyerdam .

Genus Panomya Gray, 1857. Type (by monotypy), Mya norvegica Spengler.

" Shell solid, large, irregular, with a single cardinal tooth under the beak in each valve; the pallial line of unconnected, rounded impressions; the animal larger than the shell, with large, united siphons, diverging slightly at the tips and covered with a wrinkled coriaceous epidermis; a burrower in mud and gravel, never perforating stones."

Forrester Id., Sitkalidak, Seldovia, Ala. Vic. BC

Panomya turgida Dall, 1916. " Unalaska to the Schumagin Islands, Alaska" (Dall). Type locality, Popoff Strait in the Schumagin group, Alaska.

Willett, G., Bull. So. Calif. Acad. Sci., vol. 36, no.2, p.61 states " A study of Alaskan specimens of Panomya in the writer's collection appears to indicate that there has been a rather general confusion of this species with P. ampla Dall. Dr. Dall's illustration of ampla (Proc. U.S. Nat. Mus. 24, 1902, pl.40, figs.3,4.) certainly does not represent the same shell that Oldroyd (Stanford Univ. Publ. Geol. 1, 1924, pl.10, fig 3), and Grant and Gale (op. cit. pl.21, figs. 10a,10b) figure as that species. I have not seen the specimens upon which the records of ampla from Deadmans Island (Arnold, op. cit. p 183), and Timm's Point (Clark, op. cit. p. 30) were based. However, examples secured in the latter locality by Mrs. E.M. Clark and John Q. and Tom Burch are not ampla, but nearer to, if not identical with, turgida, as figured by Dall (U.S. Nat. Mus. Bull. 112, 1921, pl.2, fig.1

Ampla is very irregular in outline, being broadly truncated at one end and rather pointed at the other, while turgida is much more equilateral."

Grant and Gale, 1931, p. 426 list Panomya arctica (Lamarck),1819. They also consider Panomya, a subgenus of Panope. Dall suggested that turgida may be a variety of arctica. Grant and Gale give Dall's range of arctica as " Arctic and boreal seas of both hemispheres, on the Pacific south to the Aleutians, and in the Atlantic in cold deepwater to the Mediterranean." (Dall,1898). Johnson gives the Atlantic range as " Arctic Ocean to Georges Bank, 25-115 fms.. Circumpolar."

Collecting data: Forrester Island, Alaska in 50 fms. (G. Willett); Victoria, British Columbia (Lewis); Sitkalidak Id., 1931 and Seldovia, Alaska 1932 - Extended range about 300 miles eastward.

Panomya beringiana Dall, 1916. " Eastern Bering Sea" (Dall). Type locality, near Pribiloff Islands in 56 fms.

Collecting data: Unalaska Island, Aleutians (Eyerdam,1932)

Panomya ampla Dall, 1898. " Arctic Ocean, Aleutian Islands, southeast to Puget Sound" (Grant and Gale). Dr. A. Myra Keen advises " The type locality of Panomya ampla is Kyska Harbor, according to the holotype label."

Collecting data: Craig, 30 fms. ; Forrester Island, Alaska in 40 fms.; (G. Willett) with this additional note " I believe Puget Sound records apply to turgida not ampla." Sitka, Alaska (Oldroyd). Reported from Friday Harbor, San Juan Ids., Wash by Eyerdam.

Genus Cyrtodaria Reuss,1800. fide Grant and Gale,1931, p. 429

Type, (fide Dall,1898), Cyrtodaria siliqua Daudin.

" Shell oblong, gaping at each end; posterior side shortest; ligament large and prominent; hinge thick, without teeth; epidermis black, extending beyond the margins; anterior muscular scar long, pallial impression irregular slightly sinuated." (Tryon S.S. Conch.)

Cyrtodaria kurriana Dunker,1862. " Arctic Ocean and south to Norton Sound, Alaska. Also on the west coast of Greenland" (Dall). Type locality, Greenland. Dr. A. Myra keen advises on this species " Mrs. Oldroyd's statement of dimentions is incorrect. It should read, Long. 35; Long.:Alt.:Crass.-- 100:40:28.". Dickson's Haven, N. Siberia 4-5 fms. clay, Vega Expd (Eyerdam)

Genus Saxicavella Martens,1885. Type, Mya plicata Montagu.

" Shell equivalve, inequilateral, flaring,oval,transverse or sub-trapezoidal, obliquely angular in the rear; hinge becoming edentate or showing on the right valve, cardinal tooth, fitting into corresponding cavity in left valve; ligament short, prominent, pallial line gently sinuous, sinus very wide, not deep."

Saxicavella pacifica Dall,1916. " Redondo Beach, Calif. (Burch) to Todos Santos Bay, Lower California. (Burch). Dr. Dall described the species from off San Diego in 131 fathoms and listed it in Bull. 112 only from the type locality.

Collecting data: Dredged in about 75 fathoms off Redondo Beach, Calif. and also in about 50 fathoms off Todos Santos Islands, Lower Calif. (Burch).

Genus Saxicava Fleuriau de Bellevue,1802. Type (by subsequent designation Children,1823), Myttlus rugosus Linnaeus,1767. fide Grant and Gale, p. 427

" Shell when young symmetrical, with two minute teeth in each valve; adult rugose, toothless; oblong, equivalve, gaping, ligament external; pallial line sinuated , not continuous. It is found in crevices of rocks and corals, and amongst the roots of seaweed, or burrowing in limestone and shells (Tryon S.S. Conch.).

Saxicava arctica (Linnaeus),1767. " Arctic Ocean to Panama. Also Atlantic" (Dall). Johnson gives the Atlantic range " Greenland to the West Indies".

About the only problem with this genus is the occasional difficulty in separating arctica from pholadis. Grant and Gale, 1931, p. 428 state that arctica has been figured as having welldeveloped spines in two radial series running from the umbonal region, but the spines may be obsolete on eroded or old specimens. Saxicava pholadis is smoother and lacks the spines. And of pholadis " It is edentulous, strongly concentrically wrinkled and spineless. It is generally much less quadrate than arctica and differs from the latter in the edentulous hinge." They suggest that the two may belong to one very variable species.

Collecting data: To list collecting localities for this very common species would be a waste of paper. It is a nestler and to be expected in wharf piles, dead shells of all kinds, Mytilus beds, in pholad holes, barnacles, rock crevices, kelp holdfasts etc. Our experience was to dredge it consistently from some rather surprising depths. It is common off Monterey in all depths down to past 40 fathoms and off Redondo Beach is a common species in the 25 fathoms gravel. (Burch); very common in Puget Sound. at many stations in Alaska,Aleutian Islands and Kamchatka. I also have it from Kola Fjord, Arctic Russia,Waigatch Islands, N.W. Siberia in 60 fms. clay. Tromso Fjord, Norway and fossil from Uddevalla, Swedish west coast(Eyerdam) . Puget Sound (G. Willett); Forrester Island, Alaska (Willett); Angeles Bay, Lower Calif. (Lowe).

Saxicava pholadis (Linnaeus), 1771. " Arctic Ocean to Panama; also Atlantic" (Dall). Johnson gives the Atlantic range " Greenland. Circumpolar." Type locality, Greenland.

Collecting data: We have found it abundant around San Pedro Bay in wharf piles and particularly old drawn piles. It was a common dredged shell off Monterey in the shale in 10-20 fathoms (Burch); Sitka, Alaska (Willett); San Pedro, Monterey, Santa Maria Bay, Lower Calif. (Lowe); many stations in Puget Sound and in Alaska and Kamchatka.. (Eyerdam).

Family PHOLADIDAE

Genus Pholas Linnaeus,1758. Type (by subsequent designation, Children, 1822), Pholas dactylus Linnaeus. fide Grant and Gale,1931, p. 430.

Grant and Gale placed our Barnea pacifica Stearns in the above genus and made Barnea Risso,1826 a subgenus of Pholas. This was at first accepted by Dr. A.M. Keen in " Abridged Check List". However, this has not been generally accepted. Barnea lacks the anterior gape of typical Pholas and differs in other particulars. Dr. A. Myra Keen (Per. Comm. Dec. 1944) states " I accepted Pholas as the correct generic name for our westcoast forms because when I tried to sort out the various exotic species on the basis of presence or absence of anterior gape, there seemed no clear cut sub-groups discernible. Therefore, I concluded that we should adopt the earliest name. However, in so doing, I overlooked the matter of the accessory plates. Upon re-shuffling our material on the basis of accessory plates, I find the story quite different. The only true Pholas of the West Coast seems to be the P. dilecta Pilsbry and Lowe, from the Panamic fauna. The species pacifica, having only one median accessory valve, falls in Barnea. Jordan collected Barnea pacifica at Scammon's Lagoon."

Genus Barnea (Leach) Risso, 1826. Type (by monotypy), Barnea spinosa Risso-- Pholas candidus Linnaeus.

" Shell oval-oblong, anteriorly gaping, a single lanceolate dorsal accessory valve; umbonal process reflexed, closely applied." (Tryon).

Barnea pacifica Stearns,1871. " San Francisco Bay to Scammons Lagoon, Lower Calif. (Jordan). Type locality, San Francisco,Bay.

Collecting data: Our experience has been to find this species much less common than the other large pholads in southern California. We dug them out of the soft shale in great numbers in the old lagoon at Playa del Rey in 1937 but that has since been cut off from the oceanand the locality destroyed. Another very common place to get them was the north bank of the antrance at Anaheim Landing, and again the new government project there has cut that off. Of course, dead valves was in frequently from the off shore reefs at many localities and particularly between Seal Beachand Huntington Beach. We have taken a few in Newport Bay. (Burch); Anhheim Bay, Calif.; San Felipe and Guaymas, Mexico (Lowe);

Genus Zirfaea Gray, 1842. Type (by subsequent designation, Gray), Pholas crispatus Linnaeus. Grant and Gale, 1931, p. 432 made this a subgenus of Pholas. This has not been generally accepted.

" Shell oval, cardinal margin scarsely reflected, no accessory valves, the beaks protected by a membrane; usually a thin fugacious epidermis; anteriorly greatly gaping." (Tryon).

Zirfaea pilsbryi Lowe, 1931. Nautilus, vol. 45, no.2, pp. 52-53, pl.3, figs. 1 & 2, Oct. 1931. This is a new name for Zirfaea gabbi Tryon, 1863 which, according to Lowe has a type identical to P. penita concamerata Deshayes. Lowe redescribed the species and it is wellfigured. Type locality, Bolinas, Calif." Bering Sea and islands south to San Diego, Calif." (Dall), to Scammons Lagoon, Lower Calif. (Jordan). Japan. (Oldroyd).

Collecting data: A very completeand interesting account of the life history and habits of this species is given by G.E. Mac Ginitie, The American Midland Naturalist, vol.16, pp. 731-735, Sept. 1935.

Our experience has been to find this species rather common boring in soft shale in San Francisco Bay, Playa del Rey, Anaheim Bay, Newport Bay, to the Estero below Ensenada, Mexico. Dead valves wash in by the thousands along the coast. (Burch); Puget Sound (G. Willett); Smith's Cove, and Alki Pt., Seattle, Wash. and Port Orchard, Wash. in heavy blue clay. (W.J. Eyerdam).

Genus Parapholas Conrad, 1849. Type (by monotypy), Pholas californicus Conrad.

" Shell oval-oblong; anterior gape closed by a thin, swollen, globose, callous plate; valves equal, divided by two radiating grooves into three portions; two dorsal valves." (Oldroyd).

Parapholas californica (Conrad), 1837. Coos Bay, Oregon to San Diego, Calif. Type locality, San Diego or Santa Barbara. Dr. A. Myra Keen advises (Per. Comm. Dec. 1944) " Dall reported Parapholas califorhica at Coos Bay, (Nautilus, vol.11, p. 66); however, this may be an error. I found large Pholadidea penita a few miles north of there that looked remarkably like Parapholas."

Collecting data: San Simeon, Cauyocos, White's Point, Playadel Rey, Anaheim Landing (Burch); San Diego, San Pedro, Laguna Beach, Pt. Firmin (San Diego Museum);

Genus Pholadidea Goodall in Turton, 1819. Type (by monotypy), Pholadidea loscombiana Goodall-- Pholas papyraceus Turton (fide Grant and Gale)

" Shell with a double or single protoplax and with or without other accessory plates, the valves prolonged posteriorly into leathery or testaceous cups or a tuve (siphonoplax) protecting the siphons." (Grant & Gale).

Pholadidea penita (Conrad), 1837. Chirikoff Islands, Alaska to San Diego (Dall, 1921). Type locality, near San Diego or Santa Barbara.

Grant and Gale, 1931, p. 434 state " This species is close to P. ovoidea (Gould), which is shorter, more ovoid, and has a vacant space between the umbonal plate and the umbo. In penita the plate is closely appressed to the umbo."

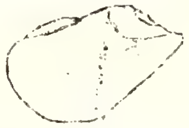
Collecting data: The typical of this species is common the length of the coast and easily chiseled out of stones of varying hardness. A list of collecting localities would be a waste of paper when this species may be taken almost every place there are rocks. (Burch); Alki Pt., Seattle and Port Orchard, Wash. in clay-shale (Eyerdam);

However, there has been a great deal of dispute about the subspecies. Pholadidea penita concamerata (Deshayes), 1839. Bering Sea and Islands south to San Diego, Calif. (Dall).

There are two very clear figures of this species in Oldroyd, pl.22, figs. 4 & 5. By checking against the descriptionand these figures we thought we knew concamerata and listed it from Puget Sound, and especially from the shale dredged off Monterey, Calif. However, Dr. A. Myra Keen compared our Monterey species with the types in the National Museum and classified them as the following species. Dr. Keen (Per. Comm. Dec. 1944) writes " I believe that Pholadidea penita concamerata is a synonym of P. penita. It is simply a form with extended flaps at the posterior margin. As far as I can observe, such specimens can be found anywhere within the range of penita At best it is probably only an ecologic form. The type locality is not Monterey. It is " Californie".

Pholadidea penita sagitta Dall, 1916. " Puget Sound to Socorro Island" (Dall) Type locality, Monterey, Calif.

We know of no place where a figure of this species is readily available. Dr. Keen advises us that this is the name of the predominant form of penita dredged up with the shale off Monterey, Calif. Dr. Keen writes (Per. Comm. Dec. 1944) " Below is a tracing of the holotype of P. sagitta (No. 63312, U.S. Nat. Mus., type locality Monterey. The author is Dall, not Stearns." The species is reported from Tacoma, Wash. by Mr. G. Willett.



Pholadidea melanura (Sowerby),1834. " Redondo Beach, Calif. in 40 fms. (Dall) to Colombia. Type locality, Monte Cristo, Colombia.

There are two very clear figures of this species in Oldroyd, pl. 22. figs. 9,10. Over a period of seven or eight years we dredged a great many tons of material from around the forty fathom level on all points off Redondo Beach, Calif. We dredged penita on countless occasions, typical penita which could not be distinguished from the same species taken littoral. Over this period we searched dilligently for anything resembling melanura without success. It is our opinion that this record is based on a misidentification. (Burch). Dr. A. Myra Keen states " It is very doubtful if P. melanura occurs in this province."

Pholadidea ovoidea (Gould),1851. " Bering Sea to Gulf of California" (Dall) Type locality, Monterey, Calif.

Collecting data: In addition to the unmistakable short ovoid form of this species our experience has been that the tubercles on the siphon are peculiar to the species. We have taken fine specimens from the stones at Monterey, Cauyocos, Morro, Pt. Firmin, Anaheim Landing, Whites Pt. etc. (Burch Kalalok,Callam Co., Wash.; Sitkalidak Id. & Knight Id.,Alaska (Eyerdam); Pt. Loma, San Diego Co., and San Mateo Co. (San Diego Museum Coll.)

Pholadidea parva Tryon,1865. San Francisco, Calif. to Scammons Lagoon, Lower Calif. Type locality, Lower Calif. in Haliotis.

In the discussions of this species the following note was made by John Burch " This species is figured in Oldroyd but not clearly and it is not easily distinguished from a small penita in my opinion. How may they be easily separated?". In response to the above the following statement was given by Dr. A. Myra Keen " Probably the easiest way to tell P. parva from P. penita is to be arbitrary and say that if you found it in Haliotis it is parva (that is, if it is'nt a Navea) , and otherwise it is penita (or maybe sagitta)." Mr. George Willett comments " Probably a form of penita."

Subgenus Nettastomella Carpenter,1865. Type, P. darwini Sowerby --(P. penita Tryon, not Conrad).

" Like Pholadidea, but small, with the siphonoplax prolonged as diverging flaps." (Dall).

Pholadidea (Nettastomella) rostrata Valenciennes,1846. " Puget Sound to San Diego, Calif." (Dall). Dr. A. Myra Keen (Per. Comm. Dec. 1944) states " The type locality of P. rostrata is Monterey, according to the holotype label; the holotype is (or was) extant in Paris and was discussed by Lamy (Jour. de Conchyl., vol.69,1925, p. 153). " " I notice that Lamy places concamerata in the synonymy of penita and makes sagitta a variety of penita."

Collecting data: This unmistakable little species is well figured in Oldroyd on two plates and four figures. We have taken it frequently, from stones at Monterey, San Simeon, Cayucos, Morro, White's Pt., Balboa Breakwater. (Burch); Friday Harbor, Wash. (Eyerdam); Laguna Beach, Sab Pedro (San Diego Museum Coll.).

Genus Martesia (Leach) Blainville,1824. Type Pholas striata Linnaeus.

" Valve lengthened behind when full-grown, by a plain border; umbonal valves one or two, dorsal and ventral margins often with narrow, accessory valves; surface impressed with one or more furrows." (Tryon).

Dr. A. Myra Keen advises " The specimen of Martesia used for the illustration in the Pelecypod Key is in the California Academyand came from Lower California, I believe, collected by Hemphill."

Martesia xylophaga Valenciennes,1846. " San Francisco, Calif. to Panama" (Dall). From the statement in Oldroyd it seems that this species was named and ffigured but never described.

Martesia intercalata Carpenter,1855. " Farralone Islands to Mazatlan, Mexico" (Dall). Type locality, Mazatlan in Spondylus.

Collecting data: Long Beach and San Pedro (Lowe);

Genus Navea Gray,1851. Type, Navea subglobosa Gray.

" Shell sub-globose, closed behind; anterior gape very large, not closed up by age; edge reflected, crenulated; valves with a sunken sub-central rib; anterior dorsal edgereflected and closely appressed to the outer surface of the valve; dorsal muscles covered with a coriaceous periostracum, and with a small, transverse posterior valve placed behind the umbos; internal process simple, elongate,arched."

Navea subglobosa Gray,1851. Lobitas to San Pedro,Calif. Type locality, California in a shell. Dr. A. Myra Keen (Per. Comm. Dec. 1944) " The type locality of Navea subglobosa is " California in a hole in a shell". The range seems to be San Pedro (Oldroyd) to Monterey or possibly to San Mateo Co. (Lobitas as Dall states it). It is fairly common in the abalones taken at Monterey. The globose form, the heavy anterior edge,and the lack of plates distinguish it from Pholadidea. Also, in the specimens I have seen, the myophore or styloid apophysis is weak or absent."

Collecting data: Great numbers off Monterey, Calif. (Burch); Cayucos (Chace)

Genus Xylophaga Turton,1822. Type Xylophaga dorsalis Turton.
" Shell like that of Teredo, but with a double protoplax and the internal apophyses obsolete; soft parts contained within the shell, without callum, siphonoplax, or calcareous tube. There is sometimes a calcareous lining to the excavation made by the animal, according to Fischer, but none of the borings I have seen from this animal exhibit it." (Dall).

Xylophaga mexicana Dall,1908. " Monterey, Calif. to Acapulco, Mexico" Type locality, off Acapulco, Mexico in 141 fathoms.

Collecting data: Our experience has been that when we picked up pieces of wood in our dredged off Redondo Beach we were likely to find Xylophaga boring in it. We picked it up rather frequently with the 25 fathoms gravel material.(Burch); Catalina Island in 30 fms. (G. Willett); Smith's Cove, Seattle in 10 fms. from piece of waterlogged branch in mud (Eyerdam).

Xylophaga californica Bartsch, 1921., Proc. Biol. Soc. Wash. 34:32. Type locality, Pt. Pinos Light, Calif. Range Pt. Pinos Light to Catalina Island (Willett).

Collecting data: Catalina Island in 30 fathoms (G. Willett).

Xylophaga washingtona Bartsch,1921. Proc. Biol. Soc. Wash. 34:32. Type locality, San Juan Island, Wash. Range: Puget Sound, Departure Bay, British Columbia,and off Oregon and Washington.

Collecting data: Olga, Wash. (from Engberg- G. Willett).

Family TEREDIDAE

Genus Bankia Gray,1840. Type, Teredo bipalmulata Lamarck.

" This genus is characterized by having pallets consisting of a series of cone-in-cone structures, which give to them the appearance of an ear of wheat" (Bartsch, 1922).

Bankia setacea (Tryon), 1863. " Bering Sea to Gulf of California" (Dall). Unalaska to Lower California.

Collecting data: Craig,Ketchikan, Seward, Alaska (G. Willett); Drier Bay, Knight Island, Alaska (Eyerdam); Crescent City, Calif. (Chace); Crescent City, Calif. and Victoria, B.C. (San Diego Museum.)

Genus Teredo Linnaeus,1758. Type Teredo navalis Linnaeus.

" In this genus the pallets are either paddle or spoon shaped. They may be distally cupped or not, or they may even bear a calcareous knob at the terminal portion" (Bartsch,1920).

Subgenus Teredo s.s.

" Teredo has the pallets paddle-shaped, with a decidedly cup-shaped depression at the distal end. The distal portion is covered with a dark periostracum, which terminates in the shape of two lateral horns" Bartsch,1922

Teredo beachi Bartsch,1920. Proc. Biol. Soc. Wash. 34:29,30. Type locality, San Pablo Bay, Calif.

Subgenus Teredops Bartsch,1921. Type, Teredo (Teredops) diegensis Bartsch.

" In the subgenus Teredops the terminal portion of the pallets ends in a calcified knob." (Bartsch, 1922).

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Teredo (Teredops) diegensis Bartsch, 1916. " San Diego to San Francisco Bay" Type locality, San Diego, Calif.

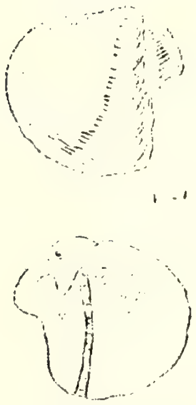
Collecting data:Taken boring in wood in the lagoon at Mugu, Ventura Co. also in San Pedro Bay, Calif. (Burch)/

Subgenus Lyrodus Gould,1870. Type, Teredo (Lyrodus) [illegible]

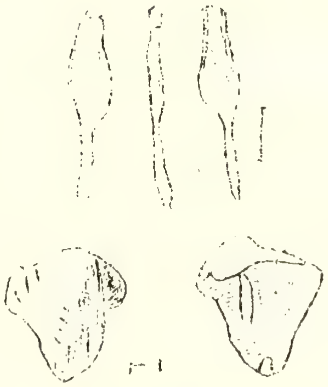
" In this subgenus the terminal portion is not cupped, but ends in two lateral forks, covered with a periostracum." (Bartsch,1922).

Teredo (Lyrodus) townsendi Bartsch,1922. " A Monograph of the American Shipworms", U.S. Natl. Museum, Bulletin 122, pp 26,27,pl/22, fig.2, pl. . 33, fig.2, 1922.

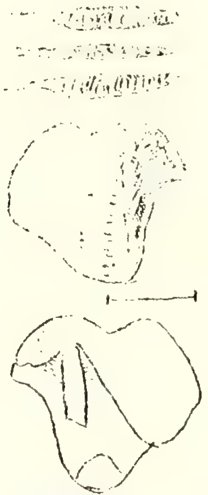
Type locality, South San Francisco, Calif. Known only from type locality.



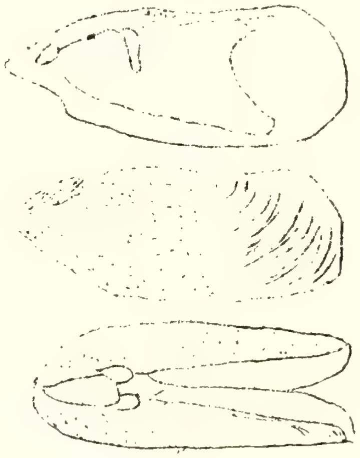
Xylophaga



Teredo



Bankia



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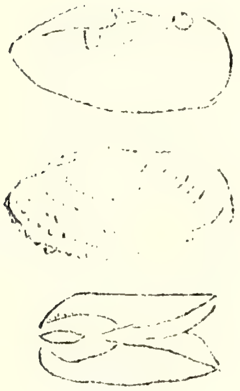
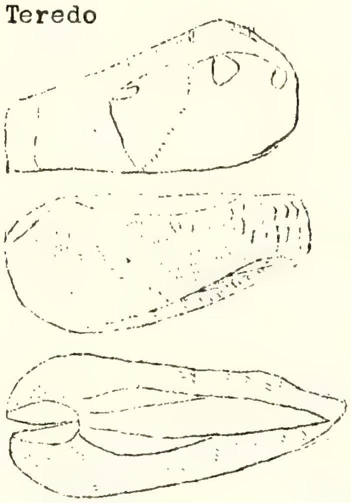
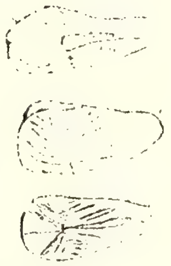


Zirfaea



Parapholas



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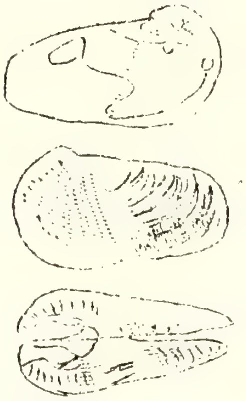

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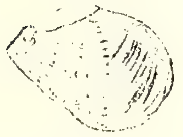

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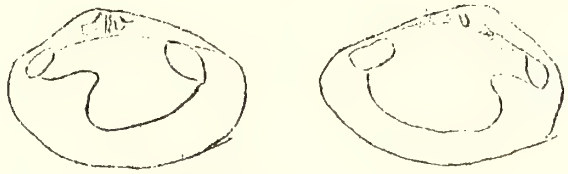

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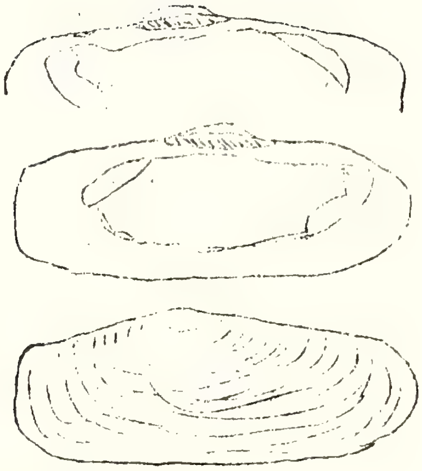
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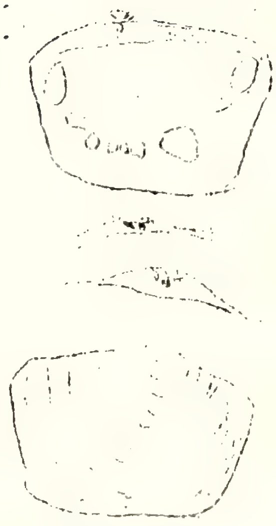
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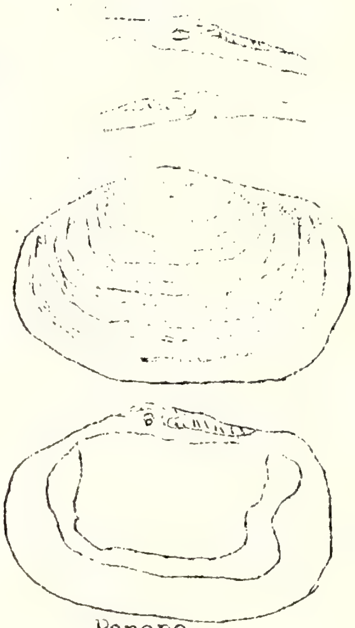
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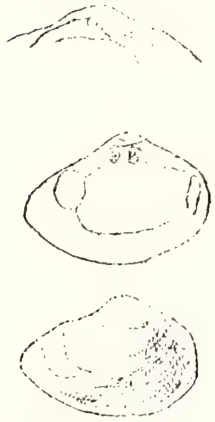
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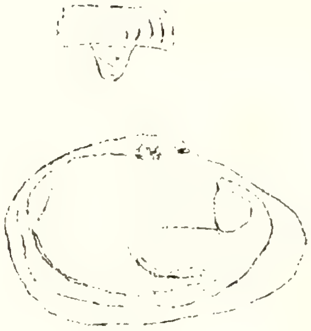
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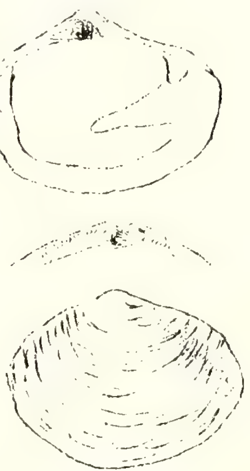
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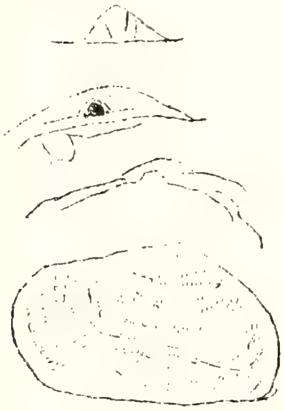
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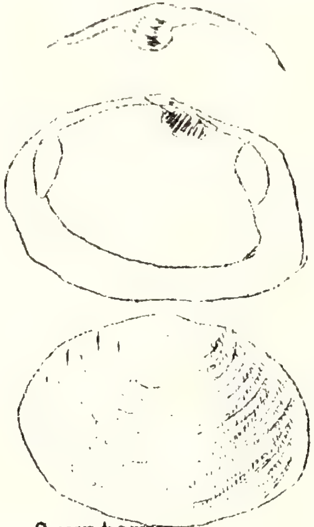
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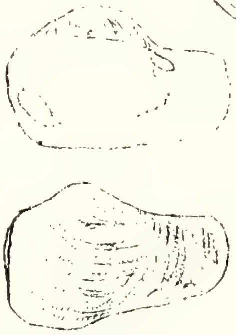
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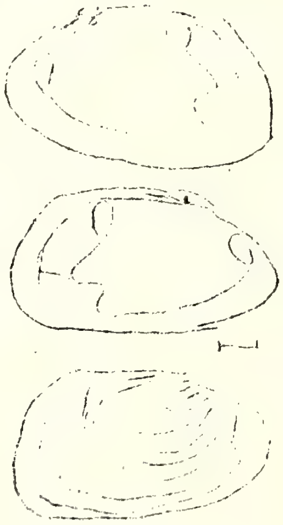
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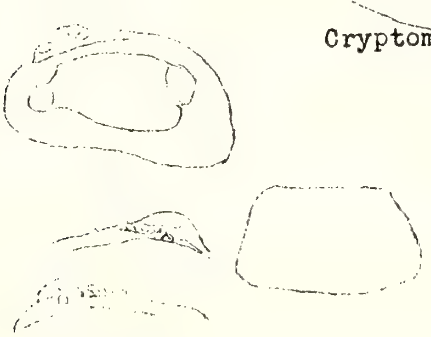
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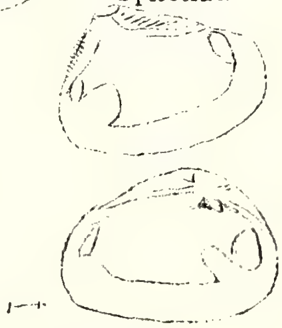
Grippina

MOUNTING MOLLUSCAN RADULAE

by Fred Tobleman

The radulae or odontophores of the mollusca are one of the most beau-tiful objects for the microscope. When properly prepared they are of great help in classifying the various orders to which they belong.

In these notes I will endeavor to describe the way that I prepare these objects and I hope that others who try will be successful in their attempts. The first thing I will describe is the glassware, tools, and reagents that I use:

Standard 3 in. by 1 in. micro slides
Cover glasses five eighths, three quarters, and seven eighths round No."
Rectangular covers about 3/4 by 1½ inches.
6 Syracuse watch glasses.
2 large test tubes.
Balsam bottle with glass rod.
Alcohol lamp.
2 small porcelain casseroles Nos. 2 & 3 (from laboratory supply house)
Get the casseroles with wood handles.
1 nest of porcelain saucers such as water color painters use, those that nest on top of each other and have a cover.
A few 4 oz. glass jars - empty mayonnaise jars will do.
Tweezers for dissecting and for cover glasses.
Scalpel or a sharp pen knife.
Test tube holder.
4 dissecting needles 2 light 2 heavy
Small mirror about 6 by 8 inches.
Chemicals and reagents.---
Can of common household lye   Sodium hydroxide commercial.
10% chromic acid solution.
Absolute wood alcohol (known in trade as Methanol 95-97%)
Mercurochrome.
Cedar wood oil.
Xylol or Benzole for balsam and clearing.
Denatured alcohol.

In working with the larger species use the small ones, as their radula shows all the details as well as the larger ones.

Dissect out the probosis or the whole bucal mass, and boil in a lye solution in a casserole, small species should be boiled whole until the animal matter is destroyed. Dried specimens should be removed from the shell with a dissecting needle, placed in a test tube with the lye, and let them stand until dissolved without boiling. Preserved material may be treated as fresh. Limpets and chitons need different treatment. Dissect as far as possible then macerate in water until the radula can be washed clean. Dilute the boiled material with an equal quantity of water, now place the mirror on the table face up, place the material in a watch glass and place on the mirror, and it will illuminate them and makes searching easier.

Place the radula in a watch glass of water as you pick them out of the lye, to wash it out.

The work now begins to be difficult and a dissecting microscope is a great help. Place specimen on slide and straighten it out. Some species are like a tube but these are easily flattened out, others are like a saucer, and have to be cut around the edge to get them flat. The worst ones are some of the operculate land mollusca whose radula is almost tied in knots and require a lot of patience to make a decent slide. This work is done before any chemical treatment as it tends to harden them.

Place specimen in one of the porcelain saucers and add a few drops of chromic acid or Mercurochrome and leave until well stained. Wash stain out and place in absolute wood alcohol using another saucer , then place in cedar oil to clear. When cleared wash out oil with xylol and mount in Canada balsam or gum damar.

After the slide is dry clean off any balsam that is outside the cover glass with denatured alcohol and if you have a turn table ring with black varnish and lable.

Perhaps you wonder what the 4 oz. glass jars are for. It is this. Many times after a days collecting one is too tired to do any more than clean the shells, or one does not wish to work the material up all at once. Place each species in a separate jar and add some lye and water and let stand. The results will be the same as if they were boiled. Mounting radulae is not difficult and I hope more will try it. If you have a polarizing outfit for your scopt try studying them by polarized light.

If anyone has any questions on the subject I will be glad to answer if I can. Have been experimenting with another method but haven't perfected it yet.

****

J.M. Dowdle, stationed somewhere in New Guinea. We are in receipt of a very interesting box of assorted shells from Jack. Whenand if we are able to properly classify them we will run a list of the species in these minutes.

W.J. Eyerdam, 7531 19th Ave., N.E., Seattle 5, Wash. " Received the Minutes and I must say they are getting more comprehensive and recognized more and more. They are also a definite morale builder with some of our men in the South Pacific that are interested in shells. ..... also received yesterday " Birds of the Southwest Pacific" from the author, Dr. Ernst Mayr with his compliments as companion on the Whitney South Sea Expedition. This is a (wartime) book printed by the Ballon Press, inc., Binghampton, N.Y. Issued by the American Museum of Natural History. This is a practical handbook by the best authority on S.W. Pacific birds and is primarily for the field student, tells him what kinds of birds he can expect to find on each island. The keys are simple and well worked out for the beginner who may not know the difference between a curlew and a godwit, or a triller and a graybird. Three perfect color plates show 39 species which include all the prominent bird families of the S.W. Pacific. To me it is of especial interest because I am quite familiar with most of the birds of the Solomons. There is even a picture of Coracina papuensis eyerdami Mayr. Dr. Mayr has also written one of the best up to date books on evolution called " Evolution and the Species Concept". This work gives a clear picture of the status of evolutionary and plastic organisms as applied to conditions of heredity, environment,isolation food habits, climate, interbreeding etc. in species, subspecies and forms of birds, insects, snails and other terrestrial animal life. It should be read by all taxonomists."

Mrs. James McKinley Cannon, Indian River Drive, Route 1, Box 615, Fort Pierce Florida. Mildred Cannon Studio. " Enclosed is my check for $2.00 to help with the expenses of the Minutes of the Conchological Club of Southern Calif. I always find them very interesting reading. The technical discussions not only hold my attention; the personal notes regarding some of your members also interest me. They are my friends and correspondents in the conchological field. My interests are 1,2,3,4,5,7,8,9, and 10. However, it will be a long time before I can give any time to No. 9 (field collecting). as my business has grown so that I now sell my shell creations to stores all over the country and in Florida I have a salesman who travels the state. Some of my brain children have even starred in a movie short for Universal.

The interests of those on the following lists will be indicated when known, by the numbers in this key.

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Stenzel, Professor H.B., Bureau of Economic Geology, The University of Texas, Austin 12, Texas. 1,3,5,7,8,11. Particular interest Genotype species Recent or fossil.
Stephens, Mrs. Kate, 3746 Park Blvd., San Diego, Calif.
Stephenson, James M., 207 Quincy, Long Beach 3, Calif.
Stevenson, A.G., 32 Pentland Ave., Mt. Eden, Auckland S 2, New Zealand.
Stillwell, Grace, 337 Cedar Ave., Long Beach 2, Calif. Ph. 631-461
Thaanum, D., 43 Coelho Way, Honolulu 8, Hawaii. 1,3
Tobleman, Fred, 13½ Brenner St., Newark, N.J. 1,3,7
Tomlin, J.R. le B., 23 Boscobel Road, St. Leonards-on-Sea, England.
Turver, Mr. and Mrs. H.R., 127 Broadway, Santa Cruz, Calif. 1,2,3,4,5,7,8,9,10
Tyselling, Lucille, 853 Atlantic Ave., Long Beach, Calif.
University of California, The Library, 405 Hilgard Ave., Los Angeles 24, Calif.
University Museum, Boulder, Colo.
University of Southern Calif., Librarian, University Park, Los Angeles 7, Cal.
Van Hyning, Dr. T., Florida State Museum, Gainesville, Florida.
Veare, Mrs. Margaret, 681 Lafayette Ave., Buffalo 9, N.Y. 1,3,4,5,7,8,9,10
Walker, Mrs. H.P., Route 2, Box 242, Healdsburg, Calif. 1,3,5,7.
Walton, M.L., 1108 N. Central Ave., Glendale, Calif.
Warren, Mrs. Fiske, 8 Mount Vernon Pl., Boston, Mass.
Webb, Pvt. Glenn R., 395th Signal Co. Avn., A.P.O. 126, c/o Postmaster, N.Y. Home address Ohio, Illinois c/o Mrs. L.O. Webb
Weber, Jay A., 10801 Biscayne Blvd., Miami, Florida.
Webber, Fred S., 271 Maple St., Holyoke, Mass. 1,3,4,5,7.
Wentworth, Dr. Hazel A., 110 Mira Mar, Long Beach, Calif.
Weeks, William H., 508 Willoughby Ave., Brooklyn, N.Y. 1,7
Whyte, Mrs. E., 58 Campbell Rd., Onehunga S-E 5, Auckland, New Zealand.
White, Miss Helen E., 335 E. 9th St., Long Beach 2, Calif.
Wilson, Miss Edna N., 718 Capistrano Place, Mission Beach, Calif.
Wilcox, Ernest N., 1738 Johnson Ave., San Luis Obispo, Calif.
Winford, Mrs. T.E., 1022 S. Windmere, Dallas, Texas.
Worthy, Mrs. Ida, R.D. Patumahoe, Auckland, New Zealand.
Wright, L.M. CEM, U.S. Navy, 418 Plaza Hotel, Miami, Florida.
Zetek, Dr. James, Drawer C., Balboa, Canal Zone.
Zook, Mrs. J.W., 800 Sixth St., San Bernardino, Calif.

MINUTES OF THE FEBRUARY MEETING OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIF.

The Conchological Club of Southern California met at the usual time and place Sunday, Feb.4,1945 with 13 members present.

It was good to have Mr. E.P. Baker present again although he has not fully recovered. We were all sorry that Miss Edna Cook, who seldom misses a meeting, was too ill to attend and we are all hoping she will soon be able to join us once more.

Mr. Baker reported an interesting article in the Feb. Nature Magazine by Gertrude M. Weber entitles " The Spell of the Shell". It was a well written and attractively illustrated paper.

Word was received by the secretary that Harold McGowan is now in Trail, Oregon, and much improved in health.

Some beautiful fossils were received from Professor H.B. Stenzel of the University of Texas which the secretary and others interested in fossils were glad to receive, and for which we return thanks.

The regular study was then taken up, the outline of which appears elsewhere in the minutes.

The meeting was then duly adjourned.

Effie M. Clark, Secretary.

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Mr. and Mrs. E.W. Boerstler, P.O. Box 494, Corona del Mar, Calif. We envy our members their collecting. So few of us are collecting these days that they must just about have Orange Co. to themselves. They write more about those very dark *Cypraea spadicea*, almost black, and the only specimens of this shade they have ever seen. And in addition to this such comments as " I have 2 yellows and I mean yellow". Th variations in shades of *Cypraea* at this time is interesting. All your editor ever took from that section were as alike as peas in a pod.

Mrs. Boerstler asks " Now I'd like to ask you if you know where I could buy *Murex carpenteri* Dall and *Murex petri* Dall. I should like very much to have them in my collection. I would exchange with anyone who has extras if I have anything they would like but am perfectly willing to buy."

In answer to the last query will say that it is hoped some of the members may be able to supply these specimens. We did have several hundred rather good duplicates of both species but our boxes of duplicates have been rather well sorted over by a host of visitors with the result that it is doubtful if we have anything left worth taking away in this group. But they are here and the Boerstlers are welcome to them if they will just pay us a visit and select their own.

Mr. and Mrs. Whitmore are still living at their home in Redondo Beach. However, the beautiful Whitmore collection is now added to the collection of E.W. Ulrich of Wilmington, Calif.

S.L. Kimball, U.S.E.D., Pier 2A, Honolulu, T. Hawaii. " .... I had heard of you through several of my very good friends suchas Phil Spicer, Wray Harris of the Bishop Museum, and Dr. Hanna of San Francisco. Phil Spicer and I have done considerable collecting together on several of the islands out here such as Midway, Christmas etc. As you may have heard, Phil. found a new Cone on Midway and I found a new one on Christmas and possibly a new *Cypraea* there. I have two specimens of it that as yet no one has been able to class--ify. Most of my collecting I take to the Bishop Museum where Wray Harris works it over for me keeping about 10% for the museum. However, I have all my fossil and dredged material from Christmas Island stored at my brothers home at 1250 N. Everett St., Glendale, Calif. and I dont know what I may have there as I have not had time to do anything about it yet.

I started collecting about twenty years ago in Florida, at that time I was mostly interested in *Liguus* as Dr. Charles Tory Simpson was a personal friend of mine and he had collected land shells his whole life mostly Liguus. However, I have a few very nice Florida marines.

At the present time I am Master of the U.S. Dredge Sacramento and I expect that before many weeks we will proceed to a forward base where the collecting should be excellent and I am anticipating adding a great deal to my collection."

MINUTES OF THE LONG BEACH SHELL CLUB Feb. 11, 1945

The Long Beach Shell Club meeting was opened by Miss Rogers, Vice-president, who told of the conference she had lately had with some of the supervisors regarding the lack of nature study classes in our city schools. Mr. Baker, who has been absent a number of times , then took over and reported that he was recovering nicely from his accident and thanked the members for letters during his absence. No reports of committees were ready . Dr. Dunkle presented the club with a large number of his mimeographed copies of the lists of fossil shells of the Upper San Pedro Formation of Signal Hill. Ones not claimed were sent to the L.A. club. Miss Rogers reported that the next exhibit of shells in the public library would be made up of specimens from the Zech collection, put there by the Agassiz Club, and that our club would have the next openingfor an exhibit about six months from now. Motion was made and seconded that Mrs. Chace be reimbursed for the reprints of the picture of the Oldroyds, Hands, Lowes and other shell collectors of Long Beach, and Miss Rogers kindly offered to see that this was done.

The program chairman then introduced the topic " What Long Beach Owes to the Amateur Collectors", by reference to an early talk on shells given here by Josiah Keep, and how Mr. Lowe, then a young boy, received this incentive to become the noted collector who has left the results of his work to call attention to our city where so much of the work was done. Reference was also made to the fact that the Oldroyds began their collecting here in Long Beach, and when the city refused to consider buying the collection they went to Stanford University as cutators of the Museum there, which made them known the world around.

It seems that in Long Beach the teachers of natural science have educated a generation and a half , and the work of Miss Romola Adams, Mrs. Johnson, and Miss Gray has left its imprint on the pupils under them. Miss Gray was drawn into active part in the work by a request from a New Hampshire collector who wanted west coast shells. Her pupils made collections which they traded for butterflies from his collection, and an active correspondence between the gentlemanand these elementary pupils continued adding to the general pleasure.

Mrs. Lehman, from the Lakewood School, told how her five year old daughter was introduced to shell life in kindergarden, and how Mrs. Johnson of Lowell taught the pupils to collect, mount and name the specimens they found on the nearby shore. The original collection was exhibited, but the speaker reminded the audience that this was only the beginning of many later collections of nature subjects, the last being one hundred twenty five specimens of minerals.

Dr. Dunkle, from Wilson High School, then spoke of giving various projects to science pupilsthus inciting them to start nature collections. Many of these collections have later become the school property, presented by the collectors. He mentioned especially the work of Miss Edith Rex on Catalina Island in interesting pupils in the abundance of marine life there, thus adding to their enjoyment as well as education. He emphasized the fact that an interest in local shells may extend to those in other sections of the country, and in other countries, as in the case of Miss Rex. The lack of available western printed material for high school pupils was for a long time one of the draw backs to such study. Dr . Dunkle told of having offered a report on climatic conditions here to California for publication, and having it refused because it was ' too local'. He regretted that the shell collection in the Municipal Auditorium was not easily available to students especially since collecting trips are not possible for the duration. Suggestions have also been made to include museum facilities for schools in the future bond election, but much missionary work will have to be done before this need will be admitted by the city. A science club, breaking up into special interest groups, has been organized at Wilson. So the work goes on.

Miss Higgins then told how her interest in shells began under her nature study teacher in Normal School, and how she used shell study in her early years of teaching in the Daisy Avenue school. She referred to the numbers of students who came into her science classesin high school and junior college with a great interest which had begun in their nature classes in the grades. Miss Higgins was a member of the first committee to make s such a course of study for the first four grades. It was in these grades that Miss Romola Adams held classes one half hour long, using specimens in glass containers. Miss Higgins often meets former pupils today who mention the interesting nature trips they used to enjoy. In Junior College work all life phyla were studied, and then by collecting all types of shore life and classifyingthem, connecting them with book descriptions and pictures, the phyla were well demonstrated. The animal's equipment to live in mud flats, sandy shores, or rocky areas was studied, and the time and energy expended thereon she felt was well repaid by the increasing interest of pupils.

Mr. Don Meadows of Polytechnix High School, a former Catalina Island teacher, felt that the island pupils had easier contact with sea life than those in this school, and so needed little interesting. He starts them here to studying by placing specimens in their hands and having them study these. He feels that large collections have two uses, one for exhibit purposes, and the other as reference material. He has mounts ready for the pupil who wishes to provide the specimen, and after a study is made and checked the student is allowed to place his name as collector, thus inciting future students to follow. Pupils often return and ask to see the school collection, and are proud of their part in it. Mention was made of the Bormann's son having his name given to a shell variety he found during his collecting, and how this can be considered an honor to his home twon which had contributed to his interest in shells. Mrs. Taylor exhibited a piece of her early handiwork, flowers made of shells and sea moss she collected here many years ago.

Miss Rogers concluded the program by telling of a piece of property in her vicinity which contains lovely old trees and a home which could be used as a museum to contain the Agassiz Club Shell Collection and well as other collections until a suitable building could be provided, and offered the hope that some one would see fit to buy the propertyand present it for this purpose.

Mr. Baker then suggested that the club members might begin a booklet for field study by writing their own experiences in collecting marine life, and bring them in at the next meeting. This was approved as a fine idea, and the meeting was adjourned.

Respectfully submitted,
Ruth E. Eaton,
Secretary.

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The next meeting of the Long Beach Shell Club will be held on March 11 at the usual place.

#44 Back Page

We regret to report the death of our correspondent S.L. Davidson of Auckland, New Zealand.

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Dr. Myrtle E. Johnson, 4647 Fifty -Fifth St., San Diego 5, Calif. " I noticed the last species on the list, however; Chlamydoconcha orcutti Dall. I have taken it, or rather, Marine Biology advanced students took it in Mission Bay " under rocks" as described. We kept the first two specimens alive for several weeks in clean sea water- gave them fresh plankton material (taken with a net) when we could get it. One of the students reported on his observations and I borrowed the specimens long enough to get motion pictures of them in action. I have a bibliofilm copy of the article by Felix Bernard , (Anatomie de C. orcutti Dall,lamellibranche a coquille interne" Annales de Sci. Nat. Zool. et Paleontologie,1897. Tome Quatrieme.) in which he describes the anatomy of a specimen sent to him by Dr. Dall. The student who was observing the living mollusks, in the rush of final examinations let the animals dieand lost the shells, unfortunately, so we have nothing to show in our collection. A similar fate befell a third specimen that another group found later.

I appreciate the material you have been sending me and may have time some day to work on shells again. I am laying the papers away for the school library. I enclose a small contribution toward postage and other expense of publication.".

W.J. Bower, 340 Third Street South, St. Petersburg 5, Florida. " It gets increasingly hard to find here species one has not had before, but I have had fair luck this season. Most of my collecting this winter is for a gift to the new Children's Museum in Nashville, Tenn. It is all financed, city has given a building, admission is to be free. They will pay express on packages sent them,and I am sure they would welcome such duplicates as any of your members wish to contribute."

E.J. Post, 609 W. Emma St., Tampa 3, Florida. Mr. Post gave your editor his Florida address but it was lost and this is the first we have heard since he left. Reports he has been busy and not too well.

E. Sidney Marks, 655 Kearny Ave., Arlington, N.J. " Congratulations on a fine piece of work. Your little publication is invaluable, especially the discussion of the various genera of bivalves. The other notes are very interesting especially those on west coast shells and I find them useful, even though I have not much west coast material."

L.M. Wright, CEM, U.S. Navy, 418 Plaza Hotel, Miami, Florida. " Have just received the copies of the Minutes of the Conchological Club of So. Calif. and am pleased beyond words. I feel we have the makings of a similar club here in Florida and just hope with the end of the war I can be instrumental in its formation. I tried to get up a paper on the Pectens recently and gave it up. They are quite a tangle of subgenera and you seem to have done a fine job for the Pacific in your #35. "

Carl W. Erickson, 4 Windsor Ave., Auburn, Mass. " As Curator of Conchology at the Worcester Museum of Natural History on a voluntary basis I have been conducting weekly classes this winter in the study of shells, or mollusks to be more exact. I have a dozen pupils, all adults, and an average attendance of about eight. No fee is charged for the instruction and I am not compensated, the Museum conducting a series of adult instruction courses, all on the same basis. I have prepared some mimeographed material and a few illustrations to go with it. Prints have been made of these illustrations and it all seems to work out very well. "

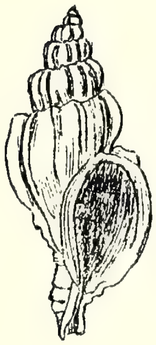
Paul H. Reed, Box 267, Tavares, Florida. We have a nice letter from the Editor of Mollusca. He states that his #3 will be mailed Jan. 25. We will look for it.

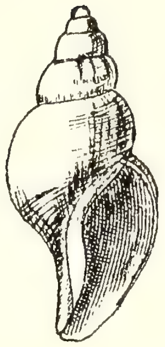
rded

#45

File

Conchological Club of Southern California
Minutes No. 45, Supplement
Feb / Mar 1945



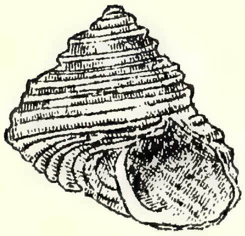


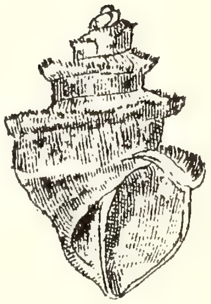
Distributional List
# of the
WEST AMERICAN MARINE MOLLUSKS
from San Diego, California
to the Polar Sea

from the proceedings of
The CONCHOLOGICAL CLUB
of SOUTHERN CALIFORNIA

Part I. Pelecypoda

John Q. Burch, Editor





24 March 1945

The following list of Mollusca is composed of species reported Recent along the west coast of North America between San Diego, Calif. and the Polar Sea. Each species will be followed by a reference to the number of the Minutes and page on which it is discussed. Species and subspecies that in our opinion have been erroneously reported in other faunal lists, or placed in the synonymy of other species, will be omitted from this list, but will be found in the text discussion. An * preceeding a species indicates that it is a questionable member of our fauna but with records that we cannot definitely disprove.

CLASS PELECYPODA

Order PRIONODESMACEA

Family SOLEMYIDAE(SOLEMYACIDAE)

Genus Solemya Lamarck,1818 33:7

Subgenus Acharax Dall, 1908 33:7

Solemya agassizii Dall, 1908 Off Tillamook Bay, Oregon, south to Aguja Point, Peru, in 1036-1800 fathoms. 33:7

Solemya johnsoni Dall,1891. Puget Sound to Panama 33:7

Subgenus Petrasma Dall,1908 33:7

Solemya panamensis Dall,1908. Monterey, Calif. to Panama. 33:7

Solemya valvulus Carpenter,1864. Monterey, Calif. to Gulf of Calif. 33:7

Family NUCULIDAE

Genus Nucula Lamarck, 1799. 33:7

Nucula exigua Sowerby, 1832. Golden Gate, Calif. to Patagonia. 33:7

Subgenus Ennucula Iredale, 1931. 33:7

Nucula cardara Dall,1916. Monterey, Calif. to Lower Calif. in deep water.33-

Nucula carlottensis Dall,1897. Queen Charlotte Islands to Anacapa Id. 33:7

Nucula darella Dall, 1916. Off San Diego, Calif. in 822 fms. 33:8

Nucula linki Dall,1916. Queen Charlotte Sound, British Columbia to Guaymas, Mexico 33:8

Nucula quirica Dall, 1916. Chugachik Bay, Cooks Inlet, Alaska. 33:8

Nucula tenuis Montagu,1808. Northern Europe, Northeastern North America. Circumboreal. Point Barrow, Alaska to Cedros Id., Mexico. 33:8

Genus Acila H. & A. Adams, 1858. 33:8

Subgenus Truncacila Schenck in Grant and Gale, 1931. 33:8

Acila castrensis Hinds, 1843. Sitka, Alaska to Cedros Id.,Mex. 33:8

Family NUCULANIDAE (LEDIDAE)

Genus Nuculana Link,1807 (Leda Schumacher, 1817)

Nuculana amblia Dall,1905. Monterey Bay, Calif. 33:9

Nuculana buccata Steenstrup,1842. Arctic Ocean and Bering Strait. Also Atlantic. 33:9

Nuculana conceptionis Dall,1896. Aleutian Islands to San Diego,Calif. 33-9

Nuculana fossa Baird,1863. Kotzebue Sound, Alaska to Puget Sound. 33:9

Nuculana fossa curtulosa Dall,1916. Bering Sea and Unalaska. 33:9

Nuculana pernula Muller,1779. Arctic Ocean to Plover Bay. Atlantic. 33:9

Subgenus Saccella Woodring,1925.

Nuculana redondoensis Burch, 1944. Monterey, Calif. to Ensenada,Mex.33:9-10

Nuculana cellulita Dall,1896. Craig, Alaska to Puget Sound. 33:10

Nuculana burchi Willett,1944. Off Redondo Beach & El Segundo,Calif. 41-20

Nuculana oxia Dall, 1916. Santa Rosa Island, Calif. to Gulf of Calif. 33:10

Nuculana minuta Frbricius, 1776. Arctic Ocean to San Diego, Calif. Also Atlantic. 33:11

Nuculana minuta lomaensis Dall, 1919. San Diego, Calif. 33:11

Nuculana penderi Dall,1910. Forrester Id., Alaska to Santa Barbara Ids. 33:11

Nuculana taphria Dall, 1897. Bodego Bay, Calif. to Lower Calif. 33:11
    Subgenus Thestyleda Iredale,1929.
Nuculana hamata Carpenter,1864. Puget Sound to Panama Bay. 33:11
Nuculana hamata limata Dall,1916. Santa Barbara to San Diego, Calif. 33:11
Nuculana leonina Dall,1916. Straits of Fuca to Monterey Bay,Calif. 33:11
    Subgenus uncertain
Nuculana amiata Dall, 1916. Off San Diego in 488 fathoms. 33:11
Nuculana dalli Krause, 1885. Unalaska, Aleutian Islands. 33:11
Nuculana extenuata Dall,1897. Off Sitka, Alaska , 1,569 fathoms. 33:11
Nuculana fiascona Dall,1916. Off San Diego, Calif. in 822 fms. 33:11
Nuculana gomphoidea Dall,1897. Off Tillamook, Oregon in 786 fms. 33:11
Nuculana liogona Dall,1916. Bering Sea in 1,401 fms. 33:11
Nuculana navissa Dall,1916. Farallones Islands to San Diego,Calif. 33:11
Nuculana phenaxia Dall,1916. Off San Diego, Calif. in 822 fms. 33:11
Nuculana pontonia Dall,1889. Santa Barbara Islands,Calif. to Peru. 33:11
Nuculana radiata Krause, 1885. Arctic Ocean; Plover Bay, E. Siberia; Okhotsk and Bering Seas. 33:11
Nuculana spargana Dall,1916. Santa Barbara Islands to Point Loma, Calif.
    33:11
    Genus Yoldia Moller,1842 (Portlandia Morch,1853) 33 :12
Yoldia myalis Couthouyi,1838. Arctic Ocean to Puget Sound. 33:12.
Yoldia limatula Say,1831. Arctic Ocean to San Diego, Calif. 33:12
Yoldia limatula gardneri Oldroyd, 1935. Gardner Bay, Pender Harbor. 33:12
Yoldia scissurata Dall,1897. Arctic Ocean to San Diego, Calif. 33:12
    Subgenus Kalayoldia Grant and Gale, 1931. 33:13
Yoldia cooperi Gabb,1865. San Francisco Bay to Todos Santos Bay,Mex. 33:13
    Subgenus Megayoldia Verrill and Bush ,1897. 33:13
Yoldia thraciaeformis Storer,1838. Arctic Ocean to Oregon. Atlantic. 33:13
Yoldia secunda Dall,1916. Southeastern Alaska in deep water. 33:13
Yoldia beringiana Dall, 1916. Bering Sea to Anacapa Id., Calif. 33:13
Yoldia montereyensis Dall,1893. Chirikoff Id., Alaska to San Diego.33:13
Yoldia martyria Dall,1897. Prince of Wales Id., Alaska to Gulf of Calif.33-13
Yoldia vancouverensis Smith,1880. Vancouver Island. 33:13
    Subgenus Yoldiella Verrill and Bush, 1897. 33:13
Yoldia siliqua Reeve,1855. Norton Sound, Alaska to Cape Simpson, B.C.33:13
Yoldia intermedia Sars, 1865. Bering Strait and Norton Sound, Alaska.
    Circumboreal. 33:13
Yoldia oricia Dall, 1916. Oregon to San Diego. 33:13
Yoldia sanesia Dall,1916. Southeastern Alaska to Pt. Conception. 33:13
Yoldia capsa Dall,1916. Aleutian Islands to Gulf of Calif. 33:13.
Yoldia cecinella Dall, 1916. Aleutian Islands to Gulf of Calif. 33:13
    Genus Cyrilla A. Adams ,1860. 33:13 (Pleurodon, Nucinella)
Cyrilla munita Carpenter in Dall,1898. Santa Rosa Island, Calif. to
    Lat. 34 S. 33:13
    Genus Malletia Desmoulins, 1832. 33:14
Malletia faba Dall,1897. Queen Charlotte Islands, B.C. to Lower Calif.3
    33:14
Malletia fiora Dall,1916. Off Sitka, Alaska in 1,569 fms. 33:14
Malletia pacifica Dall, 1897. Chignak Bay, Alaska to Monterey, Calif. 33:14
Malletia talama Dall,1916. Bering Sea to Oregon. 33:14
    Genus Tindaria Bellardi,1875. 33:14
Tindaria brunnea Dall, 1916. Bering Sea to Tillamook, Oregon.
Tindaria californica Dall, 1916. Santa Barbara to San Diego, Calif. 33:14
Tindaria cervola Dall,1916. Off San Diego in 822 fms. 33:14
Tindaria dicofania Dall,1916. Off San Diego in 822 fms. 33:14
Tindaria gibbsii Dall, 1897. Queen Charlotte Islands to Coronado Ids. 33:14

Tindaria kennerlyi Dall, 1897. Off Sitka, Alaska to Santa Barbara Ids. in deep water. 33:14

Tindaria martiniana Dall, 1916. Cape San Martin to Santa Barbara Islands in deep water. 33:14

Tindaria mexicana Dall,1908. San Diego, Calif. to Acapulco, Mexico in deep water. 33:14

Tindaria ritteri Dall, 1916. Off La Jolla, California in 293 fms. 33:14

Family GLYCYMERIDAE

Genus Glycymeris Da Costa, 1778 , 34:3

Glycymeris corteziana Dall, 1916. Santa Catalina Id. to South Coronado Island. 34:3

Glycymeris keenae Willett, 1943. Forrester Island, Alaska. 34:3

* Glycymeris migueliana Dall,1916. ,Oregon to Magdalena Bay, Lower Calif . and the Cortez Bank. 34:3

Glycymeris profunda Dall,1879. Off Catalina Island and Redondo Beach, Cal. 34:3

* Glycymeris septentrionalis (Middendorff),1849. Aleutian Islands to Forrester Island. 34:4

Glycymeris subobsoleta Carpenter, 1864. Aleutian Islands to Lower Calif.34:4

Subgenus Tuceta Bolten,1798. 34:4

*Glycymeris multicostata Sowerby, 1832. Newport Bay, Calif. to Guayquil.34:4

Family LIMOPSIDAE

Genus Limopsis Sasso,1827. 34:5

Limopsis akutanica Dall,1916. Off Akutan Id., Aleutians, 72 fms. 34:5

Limopsis diegensis Dall,1908. Santa Barbara Islands to Coronado Id. 34:5

Limopsis skenea Dall,1916. Bowers Bank, Bering Sea in 30 fms. 34:5

Subgenus Empleconia Dall,1908. 34:5

Limopsis vaginatus Dall, 1891. Bering Sea and Aleutian Islands. 34:5

Family ARCIDAE

Genus Arca Linnaeus, 1758. 34:5

Subgenus Arcopsis Von Koenen,1885. 34:5

Arca solida Broderip and Sowerby,1833. Santa Monica, Calif. to Paita, Peru. 34:5

Subgenus Acar Gray,1847. 34:6

Arca pernoides Carpenter,1857. (Arca bailyi Bartsch,1931). Topanga Beach (near Santa Monica) to San Geronimo Island, Gulf of Calif. 34:6

Subgenus Barbatia Gray,1847. 34:7

Arca reeveana d'Orbigny,1846. Santa Monica, Calif. to Peru and Gallapagos Islands. 34:7

Subgenus Larkinia Reinhart,1935. 34:7

Arca multicostata Sowerby,1833. Newport Bay, Calif. to Panama and the Gallapagos Islands. 34:7

Genus Bathyarca Kobelt,1891. 34:7

Bathyarca nucleator (Dall),1908. San Diego, Calif. to Panama. 34:7

Bathyarca pompholyx (Dall),1908. Santa Barbara, Calif. to the Gallapagos Islands and mid Pacific in deep water. 34:7

Family PINNIDAE

Genus Atrina Gray,1842. 34:7

Atrina oldroydi Dall,1901. San Pedro, Calif. to Cedros Island and Magdalena Bay, Lower Calif. 34:7

Family PTERIIDAE

Genus Pteria Scopoli,1777. 34:8

Pteria sterna Gould,1851. Hueneme Point, Calif. to the Gulf of Calif. and south to Paita, Peru. 34:8

* Pteria viridozona Dall,1916. Long Beach, Calif. 34:8

Family PEDALIONIDAE
Genus Pedalion Solander,1770 (Melina Retz.,1788, Perna Brug.,1799)34:9
Pedalion chemnitzianum d'Orbigny,1845. Coronado Islands to Chile. Also Atlantic. 34:9
Family PHILOBRYIDAE
Genus Philobrya Carpenter,1872. 34:10
Philobrya setosa Carpenter,1864. Forrester Island, Alaska to Gulf of Calif.
Family DIMYIDAE
Genus Dimya Rouault,1848. 34:10
Dimya californiana Berry,1936. Santa Monica, Calif. in 100 fms. 34:10
Dimya coralliotis Berry,1944. 10 miles off Huntington Beach, Calif. 37:11
Family OSTREIDAE
Genus Ostrea Linnaeus,1758. 34:11
* Ostrea palmula Carpenter,1857. 34:11
Ostrea lurida Carpenter,1864. Sitka, Alaska to Cape San Lucas, Lower Cal. 34:11
Ostrea lurida laticaudata Carpenter,1864. Puget Sound to Gulf of Calif.34:11
Ostrea lurida expansa Carpenter,1864. Monterey to San Diego,Calif. 34:11
Ostrea conchaphila Carpenter,1864. Redondo Beach, Calif. to Panama. 34:11
Ostrea chilensis Philippi (Introduced) Morro,Mugu,Newport Bays. 34:12
Ostrea virginica Gmelin,1792. (Introduced) 34:12
Ostrea laperousii Schrenck (Introduced) 34:12
Family PECTINIDAE
Genus Pecten Muller,1776. 35:3
Pecten diegensis Dall,1898.Monterey, Calif. to San Benito Ids. 35:4
Subgenus Chlamys Bolten,1798. 35:4
Pecten hericius Gould,1850. Port Althorp, Alaska to San Diego, Calif. 35:4,5
Pecten hericius pugetensis I.S. Oldroyd ,1920. Craig, Prince of Wales Island, to Newport Bay, Calif. 35:5
Pecten hericius albidus Dall,1906. Aleutian Islands. 35:6
Pecten hastatus Sowerby,1843. Monterey to off Newport Bay, Calif. 35:6
Pecten hindsii Carpenter,1864. Bering Sea to San Diego, Calif. 35:6
Pecten hindsii jordani Arnold,1903. Forrester Island, Alaska to Puget Sound
* Pecten hindsii kincaidi Oldroyd,1920. Portage Bay, Alaska to Puget Sound.
* Pecten islandicus Muller,1776. 35:8
Pecten beringianus Middendorff,1849. Bering Sea, Umnak Island and the Aleutians. 35:8
Pecten lowei Hertlein,1935. Catalina Island to Gulf of Calif. Galapagos.35:8
Subgenus Patinopecten Dall,1898. 35:8
Pecten caurinus Gould,1850. Wrangell, Alaska to Humboldt Bay, Calif. 35:8
Subgenus Leptopecten Verrill,1897. 35:9
Pecten latiauratus Conrad,1837. San Francisco Bay, Calif. to Gulf of California 35:9
Pecten latiauratus monotimeris Conrad,1837. Monterey, Calif. to Gulf of California 35:9
* Pecten tumbezensis d'Orbigny,1847. Santa Barbara Islands to Peru.35:10
Subgenus Plagioctenium Dall,1898. 35:10
Pecten circularis Sowerby,1835. 35:10
Pecten circularis aequisulcatus Carpenter,1865. Santa Barbara, Calif. to Cape San Lucas, Lower Calif. 35:11

Subgenus Propeamussium De Gregorio, 1884. 35:12
Pecten alaskensis Dall,1871. Pribiloff Islands, Bering Sea, and southward
to the Santa Barbara Islands. Japan. 35:12
Pecten davidsoni Dall,1897. Davidson and Bowers Banks, Bering Sea. 35:14
Subgenus Delectopecten Stewart,1930. 35:14
Pecten randolphi Dall,1897. Bering Sea to Cape Blanco, 225-1064 fms. 35:14
Pecten randolphi tillamookensis Arnold,1906. Pribiloff Islands, Bering Sea
to San Diego, Calif. 35:14a
* Pecten arces Dall,1913. 35:14
Pecten vancouverensis Whiteaves,1893. Bering Sea to San Diego, Calif. 35:14a
Pecten bistriatus Dall,1916. Off San Diego, Calif. in 822 fms. 35:14a
Pecten incongruus Dall,1916. Off San Diego, Calif. in 684 fms. 35:14a
Pecten binominatus Hanna,1924(P. andersoni Dall,1918) Dolphin and Union
Strait, Arctic Ocean. 35:14a
Subgenus Cyclopecten Verrill,1899. 35:14a
Pecten catalinensis Willett, 1931. Off Catalina Island and Redondo Beach,
California in 75 to 100 fms. 35:14a
* Pecten whiteavesi Dall. 35:14a
Genus Hinnites Defrance,1821. 35:11
Hinnites giganteus Gray,1826. Aleutian Islands to Magdalena Bay, Lower Calif.
Family LIMIDAE
Genus Lima Bruguiere,1797. 35:14b
Subgenus Mantellum Roding,1798. 35:14b
Lima dehiscens Conrad,1837. Monterey, Calif. to Acapulco,Mex. 35:14b
Subgenus Limatula Wood,1839. 35:14b
Lima attenuata Dall, 1916. 35:14b
Lima subauriculata Montagu,1808. Forrester Island, Alaska to San Quintin
Bay, Lower Calif. 35:14b
Family ANOMIIDAE
Genus Anomia Linnaeus,1758. 36:3
Anomia peruviana d'Orbigny,1846. San Pedro, Calif. to Peru and the Gallapagos
Islands. 36:3
Genus Pododesmus Philippi,1837. 36:3
Subgenus Monia Gray,1849. 36:3
Pododesmus macroschisma (Deshayes),1839. Southern Bering Sea from the Pribilof Islands to Japan and the Okhotsk Sea on the west, and on the
east south to and including the whole coast of Lower Calif. 36:3
Pododesmus foliata Broderip San Pedro, Calif. to Guayaquil. 36:4
Family MYTILIDAE
Genus Mytilus Linnaeus,1758. 36:7
Mytilus californianus Conrad,1837. Unalaska, Aleutian Islands, eastward and
southward to Socorro Island, Mexico. 36:7
Mytilus edulis Linnaeus,1758. Arctic Ocean to Cerros Island and worldwide
in temperate waters. 36:7 41:7-13
* Mytilus grayanus Dunker,1853. San Pedro to San Diego,Calif. 36:8,9.37:11,
41:7-13.
Subgenus Hormomya Morch,1850. 36:9
Mytilus stearnsi Pilsbry & Raymond,1898. Santa Barbara, Calif: to Oaxaca,
Mexico. 36:10
Genus Septifer Recluz,1848. 36:11
Septifer bifurcatus (Conrad), 1837. Crescent City, Calif. to Gulf of Calif.
Septifer bifurcatus obsoletus Dall,1916. Santa Barbara to San Diego. 36:11
Genus Volsella Scopoli,1777. (Modiolus Lamarck,1799). 36:12
Volsella modiolus (Linnaeus),1758. Arctic Ocean to Monterey,Calif. 36:12
Volsella capax (Conrad),1837. Santa Barbara, Calif. to Payta,Peru. 36:13
Volsella recta (Conrad),1837. Bolinas Bay, Calif. to Magdalena Bay. 36:13

Volsella recta flabellata (Gould),1850. Vancouver Island to San Diego.36:13
Volsella fornicata (Carpenter),1864. Trinidad to San Pedro and Cortez Bank. 36:14
Subgenus Amygdalum Megerle von Muhlfeld,1811.
Volsella pallidula (Dall),1916. Off Bodega Head, Calif. and south to Cerros Island, Lower Calif. in deep water. 36:14
Subgenus Brachidontes Swainson,1840. 36:15
Volsella demissus (Dillwyn),1817. (Introduced). San Francisco Bay. 36:15
Subgenus (Uncertain)
Volsella diegensis (Dall),1911. San Francisco Bay to Cape San Lucas. 36:15
Genus Botulina Dall,1889. 37:3,4.
Botulina denticulata (Dall),1871. Santa Barbara, Calif. to Acapulco,Mex. 37:4,5,6
Genus Botula Morch,1853. 37:6
Subgenus Adula H. & A. Adams, 1857. 37:6
Botula falcata (Gould), 1851. Coos Bay, Oregon to San Diego. 37:6
Botula californiensis (Philippi), 1847. Vancouver Island to San Diego. 37:6
Genus Dacrydium Torell,1859. 37:6
Dacrydium pacificum Dall, 1916. Bering Sea,1,401 fms. 37:6
Genus Lithophaga Roding,1798. 37:6,7
Subgenus Diberus Dall,1898. 37:7
Lithophaga plumula (Hanley),1844. Monterey, Calif. to Patagonia. 37:7
Subgenus Myoforceps Fischer,1886. 37:7
Lithophaga aristata Dillwyn,1817. La Jolla, Calif. to Peru. Atlantic. 37:7
Subgenus Labis Dall,1916. 37:7
*Lithophaga attenuata Deshayes,1836. Monterey to Patagonia. 37:7
Genus Modiolaria Beck,1838 (Musculus Roding) 37:8
Modiolaria nigra (Gray),1824. Arctic Ocean to Oregon. Circumboreal. 37:9
Modiolaria nigra obesa (Dall), 1916. Arctic Ocean to Cape Flattery. 37:9
Modiolaria protracta (Dall),1916. Nunivak Island, Bering Sea. 37:9
Modiolaria olivacea (Dall),1916. Bering Sea, Umnak Island, Alaska. 37:9
Modiolaria impressa (Dall), 1907. Petrel Bank, Bering Sea. 37:9
Modiolaria taylori (Dall),1897. Victoria, Vancouver Island, B.C. 37:9
Modiolaria substriata (Gray),1824. Arctic Ocean to Puget Sound. 37:9
Modiolaria corrugata (Stimpson), 1851. Arctic Ocean to Puget Sound. Circum-boreal. 37:9
Modiolaria vernicosa (Middendorff), 1849. Bering Sea to Sitka. Also Okhotsk Sea. 37:9
Modiolaria phenax (Dall), 1915. St. George Island, Bering Sea. 37:9
Modiolaria marmorata (Forbes), 1838. Puget Sound. Circumboreal. 37:9
Modiolaria seminuda (Dall), 1897. Bering Sea to Forrester Id.,Alaska. 37:9
Genus Crenella Brown,1827. 37:9
Crenella decussata Montagu,1808. Bering Sea to San Pedro. Atlantic. 37:9,10
Crenella divaricata d'Orbigny,1845. Santa Barbara Islands to Panama. Also West Indies. 37:10
Crenella leana Dall,1897. Aleutian Islands, eastward to Middleton Island, Alaska. 37:10
Crenella columbiana Dall,1897. Aleutian Islands to San Diego,Calif. 37:11
Crenella grisea Dall,1897. Bering Sea to Sitka, Alaska. 37:11
Crenella rotundata Dall,1916. Santa Cruz Island, Calif. in 155 fms. 37:11

Order ANOMALODESMACEA

Family PERIPLOMATIDAE

Genus Periploma Schumacher,1817. 37:12
Periploma planiuscula Sowerby,1834. Point Conception, Calif. to Negritos, Peru. 37:12
Periploma alaskana Williams,1940. Arctic Ocean to Mac-Leod Harbor,Montague Island, Prince William Sound, Alaska. 37:12

Periploma discus Stearns,1890. Monterey, Calif. to La Paz 37 :12

Subgenus Halistrepta Dall,1904. 37:12

Periploma sulcata Dall,1904. Off San Pedro & Redondo Beach, Calif. 37:12 41:p 28

Family THRACIIDAE

Genus Thracia Blainville,1824. 37:13

Thracia trapezoides Conrad,1849. Craig, Alaska to Redondo Beach, Calif. 37:13

Thracia curta Conrad,1837. Icy Cape,Arctic Ocean, Bering Sea, south to San HipolitoPoint, Lower Calif. Punta Penasco,Mex. 37:13

Thracia beringi Dall,1915. Bering Sea, Aleutian Islands and south to Sitka, Alaska. 37:14

Thracia challisiana Dall,1915. Forrester Island to Monterey, Calif. 37:14 40:26

Thracia diegensis Dall,1915. San Pedro, Calif. to Magdalena Bay. 37:14

Genus Cyathodonta Conrad,1849. 37:15

Cyathodonta undulata Conrad,1849. Monterey, Calif. to Tres Marias Islands, Mexico. 37:15

Genus Asthenothaerus Carpenter,1864. 37:16 38:16

*Asthenothaerus villosior Carpenter,1864. San Pedro, Calif. to Cape San Lucas. 37:16 38:16

Family PANDORIDAE

Genus Pandora Bruguiere,1797. 37:16

Subgenus Kennerlia Carpenter,1864. 37:16

Pandora grandis Dall,1877. Pribilof Islands, Bering Sea, to Siletz Bay, Oregon. 37:16

Pandora forresterensis Willett,1918. Forrester Island, Alaska. Prince William Sound. Frederick Sound. 37:16

Pandora glacialis Leach,1819. Arctic Ocean south to Fuca Straits. Atlantic. 37:16

Pandora glacialis cutaenia Dall,1915. Port Etches and eastward to Sitka, Alaska. 37:16

Pandora filosa Carpenter,1864. Nunivak Island, Bering Sea to Todos Santos Bay, Lower Calif. 38:3

Pandora bilirata Conrad,1855. Prince William Sound, Alaska to Point Abrejos Lower California 38:3

* Pandora granulata Dall,1915. Santa Barbara, Calif. to Guaymas, Mex. 38:3

Subgenus Heteroclidus Dall,1903. 38:3

Pandora punctata Conrad,1837. Vancouver Island to Gulf of Calif. 38:3

Family LYONSIIDAE

Genus Lyonsia Turton,1822. 38:5

Lyonsia striata Montagu,1815. Circumboreal. Aleutian Islands to San Pedro, Calif. ? 38:5

Lyonsia gouldii Dall, 1915. San Francisco Bay to Tres Marias Islands, Mex . 38:5

Lyonsia arenosa Moller,1842. Circumboreal. Arctic Sea to Japan and the Okhotsk Sea on the west and on the east to the Aleutians and Kodiak Island, Alaska. 38:5

Lyonsia californica Conrad,1837. Sitka, Alaska to Manuel's Lagoon,Mex.38:5

Lyonsia californica haroldi Dall,1915. San Francisco Bay to Morro Bay. 38:6

*Lyonsia californica nesiotes Dall, 1915. 38:6

Lyonsia pugetensis Dall,1913. Chignik Bay, Alaska to Crescent City, Calif.

Subgenus Allogramma Dall,1903. 38:7

Lyonsia amabilis Dall,1913. Off Santa Barbara Channel, Calif. in 534 fms.

Genus Entodesma Philippi,1845. 38:7

Entodesma inflatum Conrad,1837. Vancouver Id. to Guayaquil. 38:7 to Forrester Island, Alaska.

Subgenus Agriodesma Dall,1909. 38:8

Entodesma saxicola Baird, 1863. Aleutian Islands to Cape Colnette, Lower Calif. 38:8

* Entodesma scammoni Dall,1871. Port Simpson, B.C., San Diego,Calif. 38:8

Genus Mytilimeria Conrad,1837. 38:8,9

Mytilimeria nuttallii Conrad,1837. Forrester Island, Alaska to Round Island, Lower California 38:9

Family POROMYACIDAE

Genus Dermatomya Dall,1889. 38 :11

Dermatomya tenuiconcha (Dall), 1913. Alaska Peninsula to Coronado Islands in deep water. 38:11

Dermatomya trosti (Strong and Hertlein),1937. Costes Bank off San Clemennte Island. Off San Diego, Calif. 38;11

Dermatomya buttoni (Dall),1916. Monterey, Calif. in 581 fms. 38:11

Dermatomya beringiana (Dall),1916. Aleutian Islands to Tillamook, Ore.

Dermatomya leonina (Dall),1916. Off coast of Washington,877 fms. 38:11

Genus Cetoconcha Dall,1889. 38:12

Cetoconcha malospinae Dall,1916. Southwest of Sitka, Alaska.1,579 fms.

Family CUSPIDARIIDAE

Genus Cuspidaria Nardo,1840. 38:12

Cuspidaria glacialis G.O. Sars,1878. Off San Diego,239 fms. Atlantic.38:12

Cuspidaria subglacialis Dall,1913. Off California coast in deep water.38;12

Cuspidaria apodema Dall,1916. Off Sitka, Alaska to Panama Bay. 38:12

Cuspidaria chilensis Dall,1889. Off Oregon in 277 fms.and south to coast of Chile in 1,036 fms. 38:12

Genus Cardiomya A. Adams, 1864. 38:12

Cardiomya pectinata (Carpenter), 1864. Puget Sound, B.C. to Panama. 38:13

Cardiomya beringensis (Leche), 1883. Bering Sea to Kodiak Island and Panama Bay. 38:13

Cardiomya oldroydi (Dall),1924. Puget Sound to Catalina Island. 38:13

Cardiomya californica (Dall), 1886. Puget Sound to San Diego. 38:13

Cardiomya planetica (Dall), 1908. Pribiloff Islands, Bering Sea , to Coronado Islands, Lower Calif. in deep water. 38:13

Cardiomya balboae (Dall),1916. Cortez Bank, 60 fms. to Catalina Island, 50 fms. 38:13

Genus Myonera Dall and Smith,1886. 38:13

Myonera tillamookensis Dall,1916. Off Tillamook Bay, Ore.,786 fms. 38:13

Genus Plectodon Carpenter,1864. 38:13,14

Plectodon scaber Carpenter,1864. Catalina Island, Calif. to San Diego.38:14

Family VERTICORDIIDAE

Genus Verticordia J. de C. Sowerby, 1844 (ex Wood MS) 38:14,15

Subgenus Trigonulina d'Orbigny,1846. 38:15

Verticordia ornata (d'Orbigny), 1846. Monterey to Panama. Atlantic. 38:15

Genus Lyonsiella M. Sars,1872. 38:15

Lyonsiella alaskana Dall,1894. Southwest of Sitka, 1,659 fms. and off Catalina Island, Calif. in 600 fms. 38;15

Family CORBICULIDAE

Genus Corbicula Megerle von Muhlfeld,1811. 38:18

Corbicula fluminea Muller (Introduced) Columbia River, Washington.38:18

Order TELEODESMACEA

Family ASTARTIDAE

Genus Astarte Sowerby,1816. 39:5

Astarte polaris Dall,1903. Aleutian and Shumagin Ids. Circumboreal.39:6

Astarte compacta Carpenter,1864. Forrester Id. to Puget Sound. 39:6

Astarte willetti Dall,1917. Forrester Id. to Puget Sound. 39:6

Astarte rollandi Bernardi,1858. Pribilof and Aleutian Ids. to Prince William Sound,Alaska. Also Kamchatka. 39:6

Astarte rollandi loxia Dall,1902. Semidi Islands, Alaska. 39:6

Astarte arctica Gray,1824. Circumboreal. Arctic and Bering Seas and the Aleutian Islands. 39:6

Astarte borealis Schumacher,1817. Polar and Bering Seas, North Japan and eastward to Prince William Sound, Alaska. Atlantic. 39:6

Astarte alaskensis Dall,1903. Southern Bering Sea, to Aleutians and south to Puget Sound. Herschell Island, Arctic coast. 39:6

Astarte fabula Reeve,1855. Circumboreal. Arctic Sea and south in Bering Sea, Nunivak Island. 39:6

Astarte bennettii Dall,1903. Polar Sea at Bennett Island, and south in Bering Sea to Nunivak Island. 39:6

Astarte vernicosa Dall,1903. Arctic and Bering Seas. Attu to Atka ids. in the Aleutian chain. 39:7

*Astarte globosa Moller,1842. Arctic Coast to Greenland. 39:7

Astarte esquimalti Baird,1863. Aleutian Islands to Puget Sound. 39:7

Genus Bernardina Dall,1910. 39:7

Bernardina bakeri Dall, 1910. Point Loma, San Diego, Calif. to Magdalena Bay, Lower Calif. 39:7

Family CRASSATELLIDAE

Genus Crassatella Lamarck,1799 (Crassatellites Krueger,1823). 38:8

Crassatella fluctuata (Carpenter),1864. Santa Barbara Islands to San Pedro, Calif. 39:8

Genus Crassinella Guppy,1874. 39:8

Crassinella oregonensis Keen,1938. Coos Bay, Oregon. 39:9

Crassinella branneri Arnold, 1903. San Diego to Panama. 39:9

Family CARDITIDAE 39:10,11,12

Genus Glans Megerle von Muhlfeld, 1811. 39:10,11,12,13

Glans carpenteri Lamy,1922. Queen Charlotte Islands, British Columbia to Todos Santos Bay, Lower Calif. 39:13

Genus Cardita Bruguiere,1792. 39:10,11,12,13

Subgenus Cyclocardia Conrad,1867. 39:13

Cardita barbarensis Stearns,1890. Santa Barbara Channel in deep water.

Cardita gouldii Dall,1902. Off San Diego, Calif. 39:13

Cardita stearnsii Dall,1902. Puget Sound. 39:13

Cardita paucicostata Krause,1885. Arctic Sea to Fuca Straits. 39:13

Cardita crebricostata Krause,1885. Point Barrow, Alaska to Monterey, Calif. 39:13

Cardita alaskana Dall,1903. Izhut Bay,Afognak Id. to Victoria, B.C. 39:13

Cardita crassidens Broderip and Sowerby,1829. Arctic and Bering Seas and eastward to Kodiak Island, Alaska. 39:13

Cardita bailyi Burch, 1944 (Cardita nodulosa Dall) Santa Barbara to the Coronado Islands. 39:13

Cardita umnaka Willett,1932. Umnak Island, Alaska. 39:14

Cardita ventricosa Gould,1850. Belkoffski Bay, Alaska to Coronado Islands and Cortez Bank, Calif. 39:14

Cardita redondoensis Burch,1944. Off Redondo Beach, Calif. in 100 fms. 39:14,15,16

Cardita incisa Dall,1902. Unalaska to Semidi Islands, Alaska. 39:17

Genus Miodontiscus Dall,1903. 39:17

Miodontiscus prolongatus Carpenter,1864. Middleton Island, Alaska to San Diego, Calif. 39:17

Miodontiscus meridionalis Dall,1916. Off Point Loma, Calif. in 70 fms.

Genus Calyptogena Dall,1891. 39:17

Calyptogena pacifica Dall,1891. Clarence Strait, Alaska to Santa Barbara Channel. 39:17

Calyptogena elongata Dall,1916. Santa Barbara Islands to San Diego. 39:17

Genus Milneria Dall,1881. 39:17

Milneria minima Dall,1871. Monterey to Rosario Bay, Lower Calif. 39:17

Milneria kelseyi Dall,1916. Monterey to Pt. Abrejos, Lower Calif. 39:17

Family CHAMIDAE

Genus Chama Linnaeus,1758. 39:18

Chama pellucida Broderip,1835. Oregon to Chile and Galapagos. 39:18

* Chama frondosa Broderip,1835. San Diego, Calif. to Peru. 39:18

Genus Pseudochama Odhner,1917. 39:19

Pseudochama exogyra Conrad, 1837. Oregon to Panama. 39:19

Pseudochama granti Strong,1934. Monterey to Catalina Island, Calif. 39:19

Family THYASIRIDAE

Genus Thyasira Leach (in Lamarck,1818). 39:20

Thyasira bisecta Conrad, 1849. Off Alaska Peninsula and southward to the Oregon coast. 39:20

Thyasira gouldii Philippi,1845. Bering Strait to San Diego ? Atlantic.

Thyasira trisinuata d'Orbigny,1846. Sitka, Alaska to San Diego. Atlantic.

Thyasira cygnus Dall,1916. Southeastern Alaska. 39:21

Thyasira barbarensis Dall,1889. Fuca Straits to Gulf of Calif. 39:21

Thyasira excavata Dall,1901. Oregon to Gulf of Calif. 39:21

Thyasira tricarinata Dall,1916. Off Santa Barbara Islands, Calif. in 1,100 fathoms. 39:21

Subgenus Axinulus Verrill and Bush,1898. 39:21

Thyasira ferruginea Winckworth,1932(T. ferruginosa (Forbes). Aleutian Islands. Also Atlantic and Arctic. 39:21

Genus Axinopsis G.O. Sars,1878. 39:21

Axinopsis sericatus Carpenter,1864. Aleutian Islands to Todos Santos Bay, Lower Calif. 39:22

Axinopsis viridis Dall,1901. Arctic Ocean,on the west to Japan, on the east to the Aleutian and Coronado Islands. 39:22

Family UNGULINIDAE (DIPLODONTIDAE)

Genus Taras Risso,1826 (Diplodonta Brown,1831) 39:24

Taras aleuticus(Dall)1901. Cape Lisburne, Arctic Ocean, to the Aleutians and eastward to Sitka Bay, Alaska. 39:24

Taras orbellus (Gould),1852. Pribilof Islabds, Bering Sea to Gulf of California. 39:24

Taras subquadratus (Carpenter), 1855. Off Santa Monica, Calif. to Panama.

Subgenus Felaniella Dall,1899. 39:24

Taras sericatus (Reeve),1850. Monterey, Calif. to Panama. 39:24

Family LUCINIDAE

Genus Lucina Bruguiere,1797. 40:5

Subgenus Anodontia Link,1807. 40:6

*Lucina edentuloides Verrill,1870. San Clemente Id. to Gulf of Calif. 40:6

Subgenus Here Gabb,1866. 40:6

Lucina excavata Carpenter,1857. San Pedro, Calif. to Mazatlan, Mexico.

Subgenus Lucinisca Dall, 1901. 40:6

Lucina nuttallii Conrad, 1837. Monterey, Calif. to Mazatlan, Mex. 40:6

Subgenus Lucinoma Dall,1901. 40:7

Lucina annulata Reeve,1850. Port Althorp, Alaska to Coronado Ids. 40:7

Lucina aequizonata Stearns,1890. Santa Barbara Islands to south latitude 38 (Chile). 40:7

Subgenus Epilucina Dall, 1901. 40:7

Lucina californica Conrad,1837. Crescent City, Calif. to San Ignacio Lagoon, Lower Calif. 40:7,8

Subgenus Parvilucina Dall,1901. 40:8

Lucina tenuisculpta Carpenter,1865. Nunivak Id. to Coronado Ids. 40:8

Lucina approximata Dall,1901. Monterey, Calif. to Panama. 40:8

Genus Divaricella von Martens, 1880. 40:8
*Divaricella perparvula Dall, 1901. Monterey, Calif. to Ecuador. 40:8,9
Family LEPTONIDAE 40:9,10,11,12
Genus Erycina Lamarck,1805. 40:13
Erycina coronata Dall,1916 ?? Off Coronado Islands 40:13
Erycina santarosae Dall, 1916. ?? Santa Rosa Island, Calif. 40:13
Genus Kellia Turton,1822. 40:13
Kellia laperousii Deshayes,1839. Bering Sea, The Aleutian Islands and south to Panama. 40:14
Genus Rochefortia Velain,1876. 40:14
Rochefortia tumida Carpenter,1864. Shumagin Islands, Alaska to San Diego . to Scammons Lagoon, Lower Calif.
Rochefortia planata Dall,1885. Icy Cape, Arctic Ocean south to the Shumagin Islands, Alaska. 40:15
Rochefortia ferruginosa Dall, 1916. San Francisco Bay to Santa Rosa Id.
Rochefortia beringensis Dall,1916. Bering Island, Bering Sea. 40:15
Rochefortia grebnitzskii Dall, 1916. Bering Island, Bering Sea. 40:15
Rochefortia aleutica Dall,1899. Bering Sea to Coronado Islands. 40:15
Rochefortia compressa Dall,1911. Shumagin Islands,Alaska to Gulf of Calif.
Rochefortia pedroana Dall,1899. Morro Bay to San Pedro, Calif. 40:15,16
Rochefortia golischi Dall,1916. Off Santa Rosa Islands, Calif. 40:15,16
Rochefortia grippi Dall,1912. San Diego, Calif. 40:15
Genus Serridens Dall,1899. 40:16
Serridens oblonga Carpenter,1864. Monterey, Calif. to San Hipolito Pt. 40:16
Genus Pseudopythina Fischer,1884.. 40:17
Pseudopythina rugifera Carpenter,1864. 40:17 Puget Sound to San Bartholome, Lower Calif. 40:17
Pseudopythina compressa Dall,1899. Cape Lisburne, Arctic Ocean, to Acapulco.
Pseudopythina myaciformis Dall, 1916. Puget Sound. 40:17
Pseudopythina bakeri (Dall), 1916. (Erycina bakeri Dall) Off South Coronado Island, Lower Calif. 40:17
Pseudopythina chacei (Dall), 1916. (Erycina chacei Dall). Santa Rosa Island to Coronado Islands. 40:17,18
Genus Bornia Philippi, 1836. 40:18
Bornia retifera Dall,1899. Monterey to Santa Barbara Islands. Malaga Cove, Los Angeles county, Calif. 40:18
Genus Lepton Turton,1822. 40:19
Lepton meroeum Carpenter,1864. Puget Sound to San Diego. 40:19-12
Genus Lasaea Brown, 1827. 40:19,20
Lasaea cistula Keen,1938. Pt. Arena, Calif. to Ensenada, Mex. 40:19
Lasaea subviridis Dall,1899. Humboldt Co.,Calif. to Lower Calif. 40:19,20
Genus Turtonia Alder,1848. 40:20
Turtonia minuta(Fabricius),1780. Bering Strait and south to Magdalena Bay, Lower Calif. 40:20
Turtonia occidentalis Dall,1871. Plover Bay, Bering Sea to Rodman Bay, Alaska. 40:20
Genus Montacuta Turton,1822. 40:21
Montacuta balliana (Dall), 1916. (Erycina balliana Dall). Off South Coronado Island, Lower Calif. 40:21
Genus Aligena H.C. Lea,1843. 40:21,22,23
Aligena cerritensis Arnold,1903. La Jolla, Calif. to Magdalena Bay,Mex.
* Aligena nucea Dall,1913. Gulf of California. 40:23
Aligena redondoensis Burch,1941. Off Redondo Beach, Santa Rosa Id. and La Jolla, Calif. 40:23
Genus Sportella Deshayes,1858. 40:24
Sportella californica Dall,1899. ?? Monterey, Calif. 40:24

Genus Anisodonta Deshayes, 1858. 40 :24

Anisodonta pellucida Dall, 1916. Monterey Bay, Calif. off Del Monte. 40;24

Family CHLAMYDOCONCHIDAE

Genus Chlamydoconcha Dall,1884. 40:24

Chlamydoconcha orcutti Dall,1884. Monterey to Mission Bay, Calif. 40:24

Family CARDIIDAE

Genus Trachycardium Morch,1853. 41:21

Subgenus Dallocardia Stewart,1930. 41:21

Trachycardium quadragenarium (Conrad), 1837. Santa Barbara, Calif. to Todos Santos Bay, Lower Calif. 41:21

Genus Clinocardium Keen,1936. 41:22

Clinocardium blandum (Gould), 1850. Puget Sound, Wash. 41:23

Clinocardium nuttallii (Conrad), 1837. Nunivak, Pribilof, and Commander Islands, Bering Sea, south to Hakodate, Japan, and San Diego. 41 :23

Clinocardium ciliatum (Fabricius), 1780. Circumboreal. Arctic Ocean and southward to Puget Sound and North Japan. 41:24

Clinocardium californiense (Deshayes), 1841. Japan, Bering Sea eastward to Sitka, Alaska. 41:24

Clinocardium fucanum (Dall), 1907. Southern Bering Sea, off Unimak Id. and south to Monterey, Calif. 41:24

Genus Trigoniocardia Dall,1900. 41:25

Subgenus Americardia Stewart,1930. 41:25

Trigoniocardia biangulata (Sowerby), 1829. Redondo Beach, Calif. to Guayaquil. 41:25

Genus Laevicardium Swainson,1840. 41:25

Laevicardium elatum(Sowerby), 1833. San Pedro, Calif. to Panama. 41:26

Laevicardium substriatum(Conrad), 1837. Mugu, Ventura Co. to Acapulco,Mex. .

Genus Serripes Gould,1841. 41:26

Serripes groenlandicus(Bruguiere),1789. Circumboreal. Arctic Seas and south to Hakodate, Japan and Puget Sound. 41:26

Serripes laperousii (Deshayes), 1839. Circumboreal. Bering Strait to Hakodate, Japan and Sitka, Alaska. 41:26

Genus Nemocardium Meek,1876. 41:27

Nemocardium centifilosum (Carpenter), 1864. Bodega Bay to Lower Calif. 41:27

Nemocardium centifilosum richardsonii (Whiteaves), 1878. Forrester Island, Alaska to San Francisco, Calif. 41:27

Family VESICOMYACIDAE

Genus Vesicomya Dall,1886. 41:27

Vesicomya ovalis Dall,1896. Clarence Strait, Alaska, 322 fms. and in Panama Bay, in 1,672 fms. 41:27

Vesicomya lepta Dall,1896. Off Tillamook,Oregon and south to the Gulf of California in deep water. 41:27

Vesicomya stearnsii Dall,1895. Off La Jolla, Calif. and south to the Gulf of California in deep water. 41:27

Subgenus Archivesica Dall,1908. 41:28

Vesicomya gigas Dall,1896. Off Point Sur, California and in the Gulf of California in deep water. 41:28

Family VENERIDAE

Genus Dosinia Scopoli,1777. 42:5

Subgenus Dosinidia Dall,1902. 42:5

* Dosinia ponderosa Gray,1838. San Diego, Calif. to Payta, Peru. 42:6

Genus Tivela Link,1807. 42:6

Subgenus Pachydesma Conrad,1854. 42:6

Tivela stultorum (Mawe), 1823. Half Moon Bay, Calif. to Lower Calif. 42:6

Genus Transennella Dall,1883. 42:6

Transennella tantilla (Gould), 1852. Sitka, Alaska to Lower Calif. 42:6

Genus Amiantis Carpenter,1863. 42:6,7

Amiantis callosa (Conrad), 1837. Santa Monica, Calif. to Gulf of Tehuantopec, Mexico. 42:7

Genus Pitar Romer,1857. 42:7

Pitar newcombianus (Gabb), 1865. Monterey, Calif. to Gulf of Calif. and Clarion Island. 42:7

Pitar ida Tegland,1928. Sitka, Alaska. 42:7,8

Genus Antigona Schumacher,1817. 42:8

Subgenus Ventricola Roemer,1857. 42:8

Antigona fordi (Yates), 1890. Monterey, Calif. to Panama. 42:8

Genus Saxidomus Conrad,1837. 42:8

Saxidomus nuttalli Conrad,1837. Humboldt Bay, Calif. to San Martin Island, Lower Calif. 42:8

Saxidomus giganteus (Deshayes), 1839. Aleutian Islands from Atty eastward and south to Monterey, Calif. 42:9

Genus Chione Megerle von Muhlfeld,1811. 42:7

Chione fluctifraga (Sowerby),1853. San Pedro, Calif. to Gulf of Calif.42:9

Chione undatella (Sowerby),1835. Mugu, Ventura Co. to Guayaquil. 42 :9

Chione californiensis (Broderip), 1835 (C. succincta Val.) Mugu, Calif. to Panama. 42:10

Genus Venus Linnaeus,1758. 42:10

Subgenus Mercenaria Schumacher,1817. 42:10

*Venus kennicottii Dall,1871. Neah Bay, Wash. Little River, Mendocino Co. Calif. 42:10

Genus Humilaria Grant and Gale, 1931. 42:10

Humilaria kennerleyi (Carpenter in Reeve),1863. Kodiak Island, Alaska to Carmel Bay, Calif. 42:11

Genus Compsomyax Stewart,1930. 42:11

Compsomyax subdiaphana (Carpenter), 1864. Sannakh Islands,Alaska to Todos Santos Bay, Lower Calif. 42:11

Genus Protothaca Dall,1902. 42:11,12

Protothaca tenerrima (Carpenter), 1856. Vancouver, B.C. to Cape San Lucas, Lower Calif. 42:12

Protothaca restorationensis (Frizzell), 1930. Puget Sound to Half Moon Bay, Calif. 42:13

Protothaca staminea (Conrad),1837. Aleutian Islands south to Kamtchatka and northern Japan and to San Quintin Bay,Lower Calif. and Soccorro Island. 42:13

Protothaca laciniata (Carpenter), 1864 Unalaska Island,Alaska to Estero de Todos Santos Bay, Lower Calif. 42:14

Genus Venerupis Lamarck,1818. 42:14

Subgenus Ruditapes Chiamenti,1900. 42:14

Venerupis philippinarum Adams and Reeve,1850. (Introduced). Puget Sound. Ladysmith Harbor, B.C. 42:14,15

Genus Irus Oken,1815. 42:15

Irus lamellifer (Conrad), 1837. Monterey to San Diego, Calif. 42:15

Genus Liocyma Dall,1870.

Liocyma beckii Dall,1870. Plover Bay to North Japan, on the east to Port Althorp, Alaska. 42:15

Liocyma scammoni Dall,1871. Port Simpson, British Columbia. 42:15

Liocyma viridis Dall,1871. Arctic Sea southward to North Japan and on the east to the Kodiak Islands, Alaska. 42:15

Liocyma schefferi Bartsch & Rehder,1939. Chuginadak Id., Aleutians to Atka Island. 42:15

Genus Gemma Deshayes ,1853. 42:16

Gemma gemma Totten,1834. (Introduced) San Juan Islands to San Francisco . 42:16

Genus Psephidia Dall,1902. 42:16

Psephidia lordi (Baird),1863. Unalaska, Alaska to Coronado Island.42:16

Psephidia ovalis Dall,1902. St. Paul Island, Bering Sea to San Diego.42:16

Psephidia cymata Dall, 1913. Santa Barbara Islands to Gulf of Calif. 42:16

Psephidia brunnea Dall,1916.Monterey, Calif. to San Ipolito Point, Lower California. 42:16

Psephidia salmonea (Carpenter), 1864. Farralone Islands to San Martin Island, Lower Calif. 42:16

Family PETRICOLIDAE.

Genus Petricola Lamarck,1801. 42:18

Subgenus Petricolaria Stoliczka, 1870. 42:18

Petricola pholadiformis Lamarck,1818. Introduced. Willapa Harbor, Wash. and San Francisco Bay.

Subgenus Rupellaria Fleuriau-Bellevue,1802. 42:18

Petricola tellimyalis (Carpenter), 1864. Santa Monica, Calif. to San Martin Island, Mexico. 42:18,19

Petricola carditoides Conrad,1837. Vancouver Island, B.C. to Magdalena Bay, Lower California. 42:19

Petricola californiensis Pilsbry and Lowe,1932. Monterey to San Ignacio Lagoon. 42:19,20

Family COOPERELLIDAE

Genus Cooperella Carpenter, 1864. 42:20

Cooperella subdiaphana (Carpenter), 1864. Queen Charlotte Islands to Gulf of California. 42:20

Family TELLINIDAE

Genus Tellina Linnaeus, 1758. 43:5

Subgenus Tellinella "Gray" Morch,1853. 43 :5

Tellina idae Dall,1891. Santa Barbara Islands and San Pedro, Calif. 43:6

Subgenus Merisca Dall,1900. 43:6

* Tellina lamellata Carpenter,1857. 43:6 San Diego to Mazatlan.

* Tellina declivis Sowerby,1868. 43:6 Catalina Id. to Panama.

Subgenus Moerella Fischer, 1887. 43:6

Tellina salmonea Carpenter,1864. Aleutian Islands to San Pedro,Calif. 43:6

Tellina meropsis Dall,1900. San Diego, Calif. to Gulf of Calif. 43:6

Subgenus Angulus Megerle,1811. 43:6,7

Tellina carpenteri Dall,1900. Forrester Island, Alaska to Panama. 43:7

Tellina tabogensis Salisbury,1934. (T. panamensis Dall,1900) Catalina Island to Panama Bay. 43:7

Subgenus Oudardia Monterosato,1885. 43:7

Tellina modesta Carpenter,1864. Vancouver Island to Lower Calif. 43:7

Tellina buttoni Dall,1900. Lituya Bay, Alaska to Gulf of Calif. 43:8

Subgenus Peronidia Dall,1900. 43:8

Tellina bodegensis Hinds,1844. Queen Charlotte Islands, B.C. to Gulf of California. Japan? 43:8

Tellina santarosae Dall,1900. Santa Barbara Islands to Ensenada,Mex. 43:8

Tellina lutea Wood,1828. Arctic Ocean,Bering Sea, North Japan, the Aleutian Islands and east to Cooks Inlet, Alaska. 43:9

Tellina lutea venulosa Schrenck,1861. Schumagin Islands,Alaska; Sakhalin Island, Japan. 43:9

Genus Apolymetis Salisbury,1929. 43:9

Apolymetis biangulata (Carpenter),1856. (Metis alta Conrad) Santa Barbara Calif. to Ensenada, Lower Calif. 43:9,10

Genus Macoma Leach,1819. 43:10

Macoma middendorffii Dall,1884. Bering Strait, south to the Commander and Aleutian Islands and eastward to Chirikoff Island,Alaska. 43:10

Macoma incongrua (Martens), 1865. Arctic Ocean, south to Japan on the west and to San Diego, Calif. on the east. 43:10

Macoma brota Dall, 1916. Bering Sea to Puget Sound. 43:10,11

Macoma brota lipara Dall,1916. Bering Sea to Puget Sound. 43:11

Macoma sitkana Dall,1900. Kodiak Island to Lituya Bay and Sitka, Alaska.

Macoma calcarea Gmelin,1792. Circumboreal. Arctic Ocean to North Japan and to Monterey, Calif. 43:11

Macoma moesta (Deshayes), 1854. Circumboreal. Arctic Ocean, Bering Sea and eastward to the Shumagin Islands. 43:11

Macoma nasuta (Conrad), 1837. Kodiak Island and Cooks Inlet, Alaska and south to Scammon's Lagoon, Lower Calif. 43:11,12

Macoma irus (Hanley),1845 (Macoma inquinata (Deshayes) Bering Strait to Japan on the west and to Monterey on the east. 43:12

Macoma inconspicua (Broderip and Sowerby),1829. Arctic Ocean to San Diego. 43:13

* Macoma leptonidea Dall,1895. Santa Barbara Channel and Texas Coast.43:13

Macoma kelseyi Dall,1900. Puget Sound to Coos Bay, Oregon. 43:14

Macoma quadrana Dall,1916. Boca de Quadra, Alaska and south to Coronado Islands,Lower Calif. 43:14

Macoma planiuscula Grant and Gale, 1931. Nunivak Island, Alaska. 43:14

Macoma carlottensis (Whiteaves),1880. Arctic Ocean and south to Ballenas Lagoon, Lower Calif. 43:14

Macoma liotricha Dall,1897. Aleutian Islands and eastward to the Shumagin Islands, Alaska. 43:15

* Macoma expansa Carpenter,1864. Puget Sound to La Jolla, Calif. 43:15

Macoma yoldiformis Carpenter,1864. Fuca Strait to San Diego,Calif. 43:15

Macoma alaskana Dall,1900. Lituya Bay to Gulf of Georgia. 43:15

Section Rexithaerus Conrad,1869. 43:15

Macoma indentata Carpenter,1864. Puget Sound to Lower Calif. 43:15

Macoma indentata tenuirostris Dall,1900. San Pedro and Santa Barbara Islands to San Diego, Calif. 43:16

Macoma secta (Conrad),1869. Vancouver Island and south to Gulf of Calif.

Family SEMELIDAE

Genus Semele Schumacher,1817. 43:16

Semele decisa (Conrad),1837. San Pedro, Calif. to San Martin Island.43:17

Semele flavescens Gould,1851. San Pedro, Calif. to Callao, Peru. 43:17

Semele striosa C.B. Adams, 1852. Catalina Island to Panama. 43:17

Semele rupicola Dall,1915. Santa Cruz, Calif. to Gulf of Calif. 43:17

Semele rubropicta Dall,1871. Forrester Island, Alaska to Tia Juana,Mex.

Semele pacifica Dall, 1915. Catalina Island, Calif. to Acapulco, Mex. 43:17

*Semele californica A. Adams, 1854. San Diego, Calif. south. 43:18

Semele incongrua Carpenter,1864.Monterey, Calif. to Coronado Islands.43:18

Semele pulchra Sowerby,1832. Monterey, Calif. to Ecuador. 43:18

Genus Cumingia Sowerby,1833. 43:18,19

Cumingia californica Conrad,1837. Mendocino Co., Calif. to Cape San Lucas, Lower Calif. ? 43:19

Family DONACIDAE

Genus Donax Linnaeus,1758. 43:20

Donax californica Conrad,1837. Santa Barbara, Calif. to Panama. 43:20

Donax gouldii Dall,1919. San Luis Obispo, Calif. to Acapulco,Mexico.43:20

Family GARIDAE (PSAMMOBIIDAE SANGUINOLARIIDAE)

Genus Gari Schumacher,1817. 43:21

Subgenus Gobraeus Leach,1852. 43:21

Gari regularis (Carpenter), 1864. San Diego, Calif. to Cape San Lucas.

Gari californica (Conrad),1848. Japan,Kamtchatka, the Aleutian Islands and south to San Diego, Calif. 43:21

Gari edentula (Gabb),1869. San Pedro and Catalina Island to San Diego. Off Redondo Beach, Calif. 43:22.

Genus Sanguinolaria Lamarck,1799. 43:22

Subgenus Nuttallia Dall,1898. 43:22

Sanguinolaria nuttallii Conrad,1837. San Pedro, Calif. to Magdalena Bay, Lower Calif. 43:22

Genus Heterodonax Morch,1853. 43:22.

Heterodonax bimaculata Linnaeus,1758. Monterey, Calif. to Panama. Also Atlantic. 43:22

Genus Tagelus Gray,1847. 43:23

Tagelus californianus (Conrad),1837. Monterey Bay, Calif. to Gulf of Tehuantepec. 43:23

Tagelus affinis (C.B. Adams),1852. Santa Barbara, Calif. to Panama. 43:23

Tagelus subteres (Conrad),1837. Santa Barbara, Calif. to Panama. 43:23

Tagelus politus (Carpenter),1857. Santa Barbara, Calif. to Panama. 43:23

Family SOLENIDAE

Genus Solen Linnaeus,1758. 43;27

Solen sicarius Gould,1850. Vancouver Island, B.C. to San Quintin, Lower California. 43:27

Solen rosaceus Carpenter,1864. Santa Barbara, Calif. to Gulf of Calif. 43 :27

Genus Ensis Schumacher,1817. 43:27

Ensis californicus Dall,1899. Monterey, Calif. to Gulf of Calif. 43:27

Genus Siliqua Megerle von Muhlfeld,1811. 43:27

Siliqua lucida (Conrad),1837. Bolinas Bay, Calif. to Todos Santos Bay, Lower California. 43:27

Siliqua media (Sowerby),1839. Bering Sea and Arctic Ocean. 43:28

Siliqua patula (Dixon),1788. Aleutian Islands to Pismo, Calif.

Siliqua alta (Broderip and Sowerby),1829. Cooks Inlet, Alaska and westward to Bering Sea and Siberia. 43:29

Family MACTRIDAE

Genus Anatina Schumacher,1817. 44:3

Subgenus Raeta Gray,1853. 44:3

Anatina undulata (Gould),1851. San Pedro, Calif. to Panama. 44:3

Genus Mactra Linnaeus,1767. 44:3-8

Mactra californica Conrad,1837. Neah Bay, Washington to Panama 44:4,5

Mactra nasuta Gould,1851. San Pedro, Calif. to Mazatlan,Mexico. 44:4,6

Genus Spisula Gray,1837. 44:5-22

Spisula dolabriformis Conrad,1867. Redondo Beach, Calif. to Lower Calif. 44: 14-17

Spisula polynyma alaskana Dall,1894. Arctic Ocean at Cape Lisburne, south to Bering Sea and the Aleutians and eastward to Puget Sound, north Japan, the Kurile Islands and the Okhotsk Sea. 44:10,19

Spisula hemphillii (Dall),1894. Redondo Beach, Calif. to Corinto, Nicauragus. 44:19,20

Spisula catilliformis Conrad,1867. Neah Bay to San Diego,Calif. 44:20,21

Spisula falcata (Gould),1850. Puget Sound to Cortez Banks and the Coronado Islands. 44:12,21

Spisula planulata (Conrad),1837. Monterey, Calif. to Cape San Lucas.44:13,21

Genus Schizothaerus Conrad,1853. 44:22,23,24.

Schizothaerus nuttallii (Conrad),1837. Bolinas, Calif. to Scammon's Lagoon, Lower Calif. 44:22,23,24

Schizothaerus nuttallii capax (Gould),1850. Kodiak Island to Monterey. 44:22

Family MESODESMATIDAE

Genus Ervilia Turton,1822. 44:25

Ervilia californica Dall,1916. San Pedro to Magdalena Bay. 44:25

Family MYACIDAE

Genus Mya Linnaeus,1758. 44:25

Mya truncata Linnaeus,1758. Circumboreal. Arctic Ocean to Bering Island on the west and to Puget Sound on the east. 44:25

Mya truncata uddevallensis Forbes,1846. Afognak Id. and Raspberry Id. 44:25

Mya japonica Jay,1857. (Mya intermedia Dall,1898). 44:25

Mya arenaria Linnaeus,1758. Britain,Scandanavia,Greenland,Atlantic Coast of North America to Carolina, Alaska south to Japan and to Vancouver Island, B.C. San Francisco Bay (Introduced).

Genus Cryptomya Conrad,1849. 44:26

Cryptomya californica (Conrad),1837. Chicagoff Island,Alaska south to Topolobampo, Mexico. 44:26

Genus Sphenia Turton,1822. 44:27

Sphenia fragilis Carpenter,1857. Oregon to Mazatlan. 44:27

Sphenia ovoidea Carpenter,1864. Aleutian Islands to Puget Sound and San Diego. 44:27

Sphenia trunculus Dall,1916. San Diego, Calif. to Panama. 44:27

Sphenia pholadidea Dall,1916. Bolinas Bay to Imperial Beach, Calif. 44:27

(Sphenia globula Dall,1919) (Sphenia nana (Oldroyd) 44:27

Genus Platyodon Conrad,1837. 44:27

Platyodon cancellatus (Conrad),1837. Queen Charlotte Island to San Diego. 44:27

Family ALOIDIDAE (CORBULIDAE).

Genus Aloidis Megerle von Muhlfeldt,1811. 44:28 (Corbula Lamarck)

Subgenus Lentidium Cristofori and Jan.,1832. 44:28

Aloidis obesa (Hinds),1843. Catalina Island to Panama. 44:28

Aloidis fragilis (Hinds),1843. Monterey,Calif. to Salina Cruz,Mex. 44:28

Aloidis luteola (Carpenter),1864. Monterey, Calif. to Acapulco,Mexico.44:28

Aloidis porcella (Dall),1916. Santa Rosa Island to Panama. 44:29

Aloidis kelseyi (Dall),1916. Esteros Bay to Catalina Island. 44:29

Genus Grippina Dall,1912. 44:29

Grippina californica Dall,1912. San Diego, Calif. to Guadelope Id. 44:29

Family SAXICAVIDAE

Genus Panope Menard,1807. 44:29

Panope generosa Gould,1850. Forrester Island, Alaska to Scammons Lagoon, Lower Calif. Gulf of Calif. and Japan. 44:20

Genus Panomya Gray,1857. 44:30

Panomya turgida Dall,1916. Unalaska to the Schumagin Islands,Alaska. 44:30

Panomya beringiana Dall,1916. Eastern Bering Sea 44:31

Panomya ampla Dall,1898. Arctic Ocean,Aleutian Islands, to Puget Sound ?

Genus Saxicavella Martens,1885. 44:31

Saxicavella pacifica Dall,1916. Redondo Beach, Calif. to Todos Santos Bay, Lower Calif. 44:31

Genus Cyrtodaria Reuss,1800. 44:31

Cyrtodaria kurriana Dunker,1862. Arctic Ocean and south to Norton Sound, Alaska. Also on the west coast of Greenland. 44:31

Genus Saxicava Fleuriau de Bellevue,1802. 44:31

Saxicava arctica (Linnaeus),1767. Arctic Ocean to Panama. Also Atlantic. 44:32

Saxicava pholadis (Linnaeus),1771. Arctic Ocean to Panama. Also Atlantic.

Family PHOLADIDAE

Genus Barnea (Leach) Risso,1826. 44:32,33

Barnea pacifica Stearns,1871. San Francisco Bay to Scammons Lagoon. 44:32,33

Genus Zirfaea Gray,1842. 44:33

Zirfaea pilsbryi Lowe,1931. Bering Sea to Scammons Lagoon, Lower Calif.

Genus Parapholas Conrad,1849. 44:33

Parapholas californica (Conrad),1837. Coos Bay, Ore. to San Diego. 44:33

Genus Pholadidea Goodall in Turton,1819. 44:33,34

Pholadidea penita (Conrad),1837. Chirikoff Islands,Alaska to San Diego.44:33

Pholadidea penita sagitta Dall,1916. Puget Sound to Socorro Id. 44:34

Pholadidea ovoidea(Gould),1851. Bering Sea to Gulf of Calif. 44:34

Pholadidea parva Tryon,1865. San Francisco to Scammons Lagoon. 44:35

Subgenus Nettastomella Carpenter,1865. 44:35

Pholadidea rostrata Valenciennes,1846. Puget Sound to San Diego. 44:35

Genus Martesia (Leach) Blainville,1824. 44:35

Martesia xylophaga Valenciennes ,1846. San Francisco to Panama. 44:35

Martesia intercalata Carpenter,1855. Farralone Islands to Mazatlan. 44:35

Genus Navea Gray,1851. 44:35

Navea subglobosa Gray,1851. Lobitas, Calif. to San Pedro,Calif. 44:35

Genus Xylophaga Turton,1822. 44:36

Xylophaga mexicana Dall,1908.Monterey, Calif. to Acapulco,Mex. 44:36

Xylophaga californica Bartsch,1921. Pt. Pinos Light to Catalina Id. 44:36

Xylophaga washingtona Bartsch,1921. Puget Sound, Departure Bay, B.C. and off Oregon and Washington. 44:36

Family TEREDIDAE

Genus Bankia Gray,1840. 44:36

Bankia setacea (Tryon),1863. Bering Sea to Gulf of California. 44:36

Genus Teredo Linnaeus,1758. 44:36

Teredo beachi Bartsch,1920. San Pablo Bay, Calif. 44:36

Subgenus Teredops Bartsch,1921. 44:36

Teredo diegensis Bartsch,1916. San Francisco Bay to San Diego. 44:37

Subgenus Lyrodus Gould,1870. 44:37

Teredo townsendi Bartsch,1922. South San Francisco, Calif.

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During our work on the Pelecypoda we laid aside an even 100 of all notes and figures. These have been bound into book form in proper order to key with the attached faunal list. A good percentage of the 100 books have already been ordered but we have some on hand. Inasmuch as all of our members and subscribing friends already have this material in our regular minutes, it seems but reasonable to request that those wishing the bound volumes should contribute to our fund about $5 which we will use to expand our publication.

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At the last meeting of the club the matter of possibly setting an annual subscription rate to our minutes as well as perhaps establishing a small printed periodical was discussed. The matter was left to the discretion of the editor, whose opinion is that we should make no change in policy at this time. Possibly we could publish a journal but in doing so we assume a great many obligations that we are happily free from at this time. However, the opinions of our friends and members on this matter will be welcome.

****

We are going to have trouble with our paper. It seems that the government has ruled against the manufacture of any more 20 lb. paper. The best we can get is 16 lb. which seems to be entirely too thin to mimeograph with any success on both sides. Page 2 of Minutes #44 is on plain newsprint. This is far from the quality of paper we would prefer to use but if we are only going to run one side of the sheet we might as well use newsprint which is comparatively very inexpensive. In fact the cost of the two sheets is much less than one sheet of the paper we have been using. Anyway, it seems that we are not going to mimeograph on what we would like but rather on what we can get.

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CORRECTIONS AND ADDITIONS

Mr. George Willett has sent in the following corrections:

" A few minor errors noted in your list of Pelecypoda:

Galapagos has only one L, and Pribilof one F, so these are misspelled throughout.

Your summation of ranges in the list do not follow collecting data as given under the species in the following:

Modiolaria vernicosa should be SE to Forrester Id.
Crenella grisea " SE to " "
Pseudochama granti S. to San Benitos
Pseudopythina rugifera N. to Craig, Alaska
Tellina salmonea S. to Los Coronados
Macoma quadrans, N. to Ketchikan and Craig, Alaska
Panomya turgida, S. to Forrester Id.; also I think Puget Sd. records of Panomya must apply to this species, not to ampla, but I have mislaid Oldroyd's paper on Puget Sound and do not remember how she treated it. I know she had the two species mixed later.

Mr. Willett also sent in the following extension of range.

Plectodon scaber Carpenter (Minutes #38, p. 14) add: Clarion Island-Banderas Bay-Chamela Bay, Mexico (18 degrees N. Lat.).

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA

March 1945

A letter to the members by the editor: We have been playing with our cameras lately. The result is the inclosed plate. We are not too proud of it and hope to improve our tecnique. While these pictures are very inexpensive compared to other plates, they do, nevertheless, cost us some money. The expense of making such material for each of our active members would be nominal. However, we have by invitation increased our mailing list to the rather amazing figure of around 700. A large part of those are libraries of museumsand universities. These institutions would in large part gladly subscribe to a reasonably priced periodical but cannot officially simply donate a sum to our fund. On the other hand neither your present editor nor any other member of the club seems disposed to enter the publishing business either as individuals or on behalf of the club. Our little paper is simply our hobby and we hesitate to permit it to get out of hand. We all have our regular business or job, and our time for shell affairs is naturally limited to hours of recreation. The expenses of our mimeographing material has been nicely covered by the generous contributions of members and friends. So this photographic idea is simply submitted. If we receive enough money to cover the costs we will continue to include them with our other papers. If not, the idea must be abandoned. So this is more or less a " passing of the hat" on the photographic deal.

We had thought the " publication" complaint was more or less forgotten, our paper having been quoted and cited by a number of authors. However, we have recently received a letter from one author wishing to quote some of our conclusions who is concerned about including us in his formal bibliography of publications because of the format of our paper. All of this still seems very absurd to me. Of course, my life has been spent largely in courts and law offices where there is a more democratic atmosphere regarding publications. Some very fine services to lawyers are published by mimeograph or multigraph. Some of the greatest collections of nonsense in my library either at the office or in my home conchological library are bound in ornate covers including the gold lettering, and some of the files most treasured in both libraries are papers scrawled with pencil on scratch paper by men or women whom I think knew what they were writing about. You may select your scientist if you wish by his taste in type or binding, but please accept my advice and, if you wish to win your case, choose your lawyer from those who judge the subject matter of their books rather than the format. But please do not infer from the above that we think we are among those who know what we are talking about. We are not in the least like one eminent scholar in the field of conchology who when asked a pertinent question about a disputed point of taxonomy replied " Why bring that up again, I settled that matter ten years ago."

* * *

Please mail all news about shells, shell publications etc. to your editor,

John Q. Burch,
4206 Halldale Ave.,
Los Angeles 37, California.

The next meeting will be held April 1,1945, at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. at 2:30 P.M.

Dr. F.M. MacFarland, 775 Santa Ynez, Stanford University, Calif.
" I shall be glad indeed to be counted in your list of friends for the February issue of the Minutes, if I am not too late. Something like this:

F.M. MacFarland, 775 Santa Ynez St., Stanford University, Calif.
3,9,10. Especially desirour of securing specimens in alcohol or dilute formalin of Opisthobranch Mollusks.

Your recent radula notes prompts me to add a few points from my own experience.

Clean radula in dilute potassium hydroxide, cautiously heating over a small flame in a test tube,applying the flame near the surface of the liquid rather than at the bottom of the tube. Wash well in several changes of water. Examine in dilute glycerine. Rinse in distilled waterand stain in a pale solution of Bismarck Brown in distilled water until desired depth of stain is reached. Rinse well and transfer to dilute glycerine. I have used many other stains such as Dahlia, Acid Fuchsin, Basic Fuchsin, Orange G. and the like but find Bismarck Brown most reliable. For permanent mounts mount in glycerine jelly, or dehydrate, clear and mount in Clarite or Euparal. Dammar Balsam may also be used, but Canada Balsam is not advisable, since it yellows with age and may also crystallize. Many fine details are obscured by the high index of refraction of these media, which are preserved in Glycerine Jelly. After mounting in a drop of glycerine jelly and cooling the superflous medium should be carefully cleaned off the edges of the cover glass, and then seal in the preparation with a good cover glass cement such as Gold size, Brunswick Black, white zinc cement, or a seal of thin Clarite or Euparal may be painted around the edge of the cover with a fine brush. Another simple method of rendering the mount permanent is to place a large drop of Clarite upon the cover of the glycerine jelly mount and add a second cover, pressing down to force out most of the Clarite from beneath the upper cover which must be larger than the lower one, thus sealing the whole permanently.

Another method which I frequently use is to mount in glycerine jelly between two covers, one larger than the other, e.g. 7/8" and ½" or 5/8". The specimen is arranged upon the larger cover, just the right amount of glycerine jelly is added and then the second cover. After thorough cooling and the cleaning away of any excess of the glycerine jellythe whole is placed upon a slideupon a drop of Clarite, the larger cover being uppermost and pressed down. The end result is a radula mount in glycerine jelly completely sealed in Clarite or Euparal. Of course, care should be taken to arrange the radula so that the side to be uppermost in the finished mount is turned downward upon the large cover. The method requires care and patience but the end results are so good that it is worth trying. In addition to the whole radula I make others with isolated teeth, with rows cut apart, and with other modifications so as to secure all possible views of the teeth from all angles, for their actual shape is not always obvious. Sections of the preserved radulae and of the whole pharyngeal bulb made after imbedding in celloidin are also very valuable, but that involves the complicated tecnique for one without extensive laboratory facilities and training. "

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Lieutenant John E. Davis, Box 552, LVAAF, Las Vegas, Nevada. We are in receipt of a nice box of specimens of Siliqua patula Dixon with the lieutenants compliments and they will be at the next meeting of the club for those who may need them in their collections. They were collected from Newport,Oregon Jan.9th,1945.

Ernest N. Wilcox, 1738 Johnson Ave.,San Luis Obispo, Calif. Phone 2008. His interestsare, according to the table in Min.44- 1,2,3,4,7,9.

Miss Julia Ellen Rogers, 355 Junipero Ave., Long Beach 4, Calif. It is to be assumed that we all know that Miss Rogers is the author of the famous " Shell Book" and we regret to learn that the book is out of print probably for the duration of the war. Miss Rogers recently received a very interesting letter which was sent to her publishers and forwarded to her. It is from, Mr. C.L. Fox, Siota, Solomon Islands " Dear Miss Rogers: An American here has loaned me your Shell Book, and I am absorbing all I can before returning it. I have had so much pleasure from it that I feel that I ought to thank you. I did not collect shells before the war, although I have been living here 43 years as a missionary, but when the Japs came in I took it up as a hobbyto keep my mind off other things in the beauty and glory of the shells. Nearly 50 years ago I did have to study them (working on paleontology) and I did classify the collection of a New Zealand museum, but I see nomenclature has changed e.g. what we called Lamellibranchs you call Pelecypods. So far I have about 300 species from up to 5 miles from where I live. The commonest is Hippopus maculatus. You could get 100 in an hour but there seems to be also a slightly different Hippopus also (I am testing specimens). The next most common I suppose are Trochus and Delphinula and Cypraea (I have 14 species). Very many I can't identify from your book. There is a small Cypraea brown, black lines with a scarlet blob at each end. There is a very odd Arca quite out of the common and a very handsome little shell, white banded brown which is perhaps a Distorsio. There are many brilliantly colored oysters of different genera. A Voluta said to kill a man with its bite. Many Conus and some lovely Strombus, Of course, several fine Mitra, episcopalis and papalis both common., two Pterocera and many Murex. But I wish I could be sure of my identifications. As you know all the native money of Melanesia is made from shells, small discs coarser and fine with a hole drilled and then strung, It takes many fathoms to buy a wife, canoe or pig. There are two sorts made at only two mints in the Solomons, red (sub blood) and white (moon blood). The red is made from a shell called Homee a Spondylus sp. and the white from a beautiful Arca called Kandakee. The sun blood is the more valuable. But I must not weary you.

The point is this, I have had so much pleasure from your book while it was with me, that as a very small return for that pleasure, you might like some Solomon Island shells. The Americans here buy the large and handsome ones such as Cypraea,Triton,Dolium, and Turbo, but they care nothing for the little shells often so very lovely. You, I somehow think, would like them all. So far, of many of my species I only have one,and could not bear to part with it. But I suppose I have extras of half the shells at least and in time I shall have several of every kind. You so obviously love shells, as I do, that I feel sure you wont mind my writing, and while there are so many Americans, whom I have got to know, returning home, there might be a chance to get something to you. My address is Dr. Fox, Siota, Solomon Islands. (I know a little island where you can usually get Cypraea aurantea).

I hope it is quite clear you would not have to pay for the shells, most certainly not. I would not sell them. I collect just for myself and my sister in New Zealand.

Ovula decorates the prows of fighting canoes, and strings of it are worn, round the forehead and below the knees, of dancers.

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Mrs. North McLean," Ashrama", Washington, Conn. " ... We are at home this winter and not especially enjoying the extreme cold, (down to and even below zero)) but are glad to give up the gasoline if it helps our boys at war. I enjoy reading the Minutes nowand look forward to a real study of them later."

Professor Willis G. Hewatt, Professor of Biology, Texas Christian University Fort Worth, Texas. " I am indeed very grateful to you for the recent copy of the Minutes of the Conchological Club of Southern California. I have been very interested in the marine faunas of the California coast during the past twelve years and am at present preparing a report on marine studies on Santa Cruz Island."

Walter C. Caldwell, 2208 Massachusetts Ave., Tampa 3, Florida. " Just a line to let you know how much I appreciate the " Minutes". I am now stationed at Camp Barkeley, Texas. but think it best for you to continue sending the " Minutes" to my home address. I have found collecting rather poor in this area, perhaps due in part to my limited amount of time."

We assume that you know Caldwell is serving in the U.S. Army.

Dr. L.G. Hertlein, California Academy of Sciences, Golden Gate Park, San Francisco, Calif. " This morning I received a copy of your " Distributional List of the West American Marine Mollusks from San Diego, California to the Polar Sea". I hasten to acknowledge receipt of it and to compliment you on bringing all the information together under one cover. I don't know how you get so much done but I am glad you do and can assure you that it is useful work. I have only one suggestion regarding future issues of the " Minutes", that is to encourage those who furnish information on the species of a genus or subgenus to include a key. I find such keys very useful especially when available for a group of shells with which one is not very familiar. "

Charles D. Nelson, R #5, Lake Michigan Drive, Grand Rapids, Mich. " Enclosed please find my check for $2.00. Kindly keep my name on your mailing list. Your " Minutes" are both entertaining and informative, and like old wine they improve with age. Many more years and more power to you.

Shortly after I wrote you last spring the Board of Education closed Davis Technical High School where I had taught for nearly 25 years, and scattered its teachers to the other high schools. In those 25 years I had built up a sizable Museum of Natural History, mostly of my own collection or by exchanges with friends. This had to be packed up and is now stored .

I am doing a little with the Naiads and have had exchanges from Eyerdam, the Turvers, Blakeslee, the Kotos, Doc Bales, Brand and several others. These contacts have most of them been from tips in your Minutes. Thanks a lot."

C.L. Brown, 1218 McConnell Ave., Santa Rosa, Calif. was on the faculty of the University of Nevada for a good many years but is now an enthusiastic student of natural history. He has sent us rather an extensive list of species which he is interested in purchasing. Members having duplicate specimens for sale should write him.

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New Publications Received

" Variations in Strombus Pugilis Alatus" by Calvin Goodrich, Occasional Papers of the Museum of Zoology, University of Michigan, No. 490, Dec.11, 1944. 10 pp

" A Revision of the Mollusca of Indiana", by Calvin Goodrich and Henry vander Schalie, The American Midland Naturalist, Vol.32, No.2, pp. 257-326, Sept., 1944. 71 pages

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Your editor of these minutes has just been informed that if our members in the armed forces overseas will write him a letter specifically requesting that the minutes be mailed to them, there is a special postal regulation permitting us to stamp or write the number of the P.O. regulation and in this manner we can mail them the minutes without paying the first class postage rate. So they are invited to do this. Of course, it is possible that they may get them quicker as we are now mailing them- first class mail.

Information about the International Zoological Commission

Bulletin of Zoological Nomenclature
vol.1, pt. 1, May,1943: 9 shillings
2, July,1943: 5 "
3, Oct.,1943: 1 pound, 10 shillings
4, Oct.,1944: 6 shillings

Total to date: L2- 10 sh .
(about $10)
(Cost of advance subscriptions not stated on cover.)

Opinions and Declarations rendered by the International Commission on Zooligal Nomenclature:

The above work is being published in 3 volumes concurrently:

Volume 1. This volume will contain Declarations 1-9 (which have never previously been published) and Opinions 1-133 (the original issue of which is now out of print). Parts 1-12 (containing Declarations 1-9 and Opinions 1-3) have now been published. Parts 13-15, containing Opinions 4-6, are in the press.

Volume 2. This volume will be issued in 52 Parts, comprising all the decisions taken by the International Commission at their meeting at Lisbon in 1935, namely Declatations 10-12 and Opinions 134-181. Part 52 will contain the index and title page of the volume. Parts 1-25, containing Declarations 10-12 and Opinions 134-155, have now been published. Part 26 is in press.

Volume 3. This volume, which will commence with Opinion 182, will contain the Opinions adopted by the International Commission since their meeting at Lisbon in 1935. Parts 1-4, containing Opinions 182-185, are in press.

Prices of Opinions 134-152, all that are in the Stanford Library to date, total 2 pounds, 2 shillings, 4 pence (about $8.50)

The most interesting Opinions to malacologists are:
138-- relating to the replacement of invalid names (1 shilling 6 pence)
141-- relating to the naming of families and subfamilies (2 shill. 6 pence)
145-- on the status of names first published in works rejected for nomenclaturial purposes and subsequently published in other works.. (2 sh. 6 d).
147-- relating to the rejection as homonyms of generic and subgeneric names of the same origin and meaning as names previously published (2 sh. 6 d).
148-- availability of generic names proposed as emendations of or as substitutes for earlier generic names of the same origin and meaning (2 sh. 6 d).

The Declarations are only statements of general principles, and several are already included in the Schenckand McMasters " Procedure in Taxonomy." We do not have a complete set as yet. The titles we have are:
Declaration 1: Code of ethics to be observed in the renaming of homonyms(1/6
2: On the importance of avoiding the issue of authors" reprints in advance of the publication of the work.. (1/6)
3: On the importance of giving a clear indication of the date of issue of every zoological publication (1/6)
4: On the need for avoiding intemperate language in discussions on zoological nomenclature (1/6)
5: On the grant to the Int. Comm. Zool. Nomencl. of plenary powers to suspend the rules in certain cases (2/6)

Declaration 6 and 8 missing

9: On the desirability of universities including zoological nomenclature in their courses of general and systematic zoology (1/ 6)

10: On the importance of forming specialist groups for the study of the nomenclature of particular divisions of the Animal Kingdom. (1/ 6)

11: On the need for a clear indication in the description of new genera and species of the Order and Family involved. (1/ 6)

Total cost of these Declarations listed: 11 sh. 6 pence

The prices that the Commission is obliged to ask for the publications will probably mean that only large libraries can finance a full set. As the article in the Journal of Paleontology points out, the Commission is no longer subsidized by the Smithsonian Institution and is obliged to raise funds for the publication by asking for donations on the part of learned societies and museums the world over. A fund of L 1800 is needed to finance the re-publication of Opinions 1-133, now out of print, and to work off the back log of unpublished Opinions already reached by the Commission. Once this fund is accumulated, the sale of publications will keep up the costs os issuing new Opinions, and it is hoped that speedy action can be taken on new questions. These questions will be published as received in the Bulletin, thus enabling interested persons to keep abreast of the progress of the Commission.

Contributions should be sent to the International Commission at their Publications Office, 41, Queen's Gate, London, S.W. 7.

The above information is from a letter of Dr. A. Myra Keen of Stanford University.

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Donations to the Publications Fund of the International Commission are acknowledged yearly in the Bulletin. Not many American organizations have contributed as yet, and in two years only 773 of the needed 1800 pounds have been raised.

This is a very worthy enterprise, the importance of which is obvious. Our members and friends who feel disposed to make a contribution are invited to send in the sum to the editor of these minutes who will transmit the same to London in the name of the Conchological Club of Southern California.

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Another British publication which might be of interest to the Club is the section on Mollusca from the Zoological Record. Current issues may be obtained now from Natural History Books, 6843 Hobert Ave., Chicago 31, Illinois. The section on Mollusca costs 8 shillings ($2.05 from Chicago including postage). The Zoological Record is issued annually and is an alalytical bibliography of publications in each of several fields. The last one on Mollusca, for 1942 (issued Jan. 1944), lists 444 titles which are indexed both topically (including geographically and geologically) and systematically. There are 64 pages in this Section for 1942.

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The following notice appearing in the Proceedings of the Malacological Society of London may be of interest to some of our members " A limited number (25) of separate copies of the PRODROME OF A MONOGRAPH ON LIVING CYPRAEIDAE by Dr. F.A. Schilder and Dr. M. Schilder is on sale at 15s each, post free. Application should be made to the editor. "

A short time ago we received a box of shells from New Guinea, sent us by our member J.M. Dowdle. These specimens were turned over to Dr. H.R. Hill, of the Los Angeles Museum for classification. The following species were listed by Dr. Hill.

1. Cypraea arabica L.
2. " annulus L.
3. " erosa Lam.
4. " carneola L.
5. " lynx L.
6. " talpa L.
7. " isabella L.
8. " cribraria L.
9. " tabescens Dillwyn
10. " subcylindrica Sby.
11. " stolida L.
12. " neglecta Sby.
13. Conus glaus Hwass
14. " textile L.
15. " eburneus Hwass
16. " mustellinus Hwass
17. " musicus Hwass
18. " stercus-muscarum L.
19. " arenatus Hwass
20. " emaciatus Reeve
21. " aulicus L.
22. " imperialis L.
23. " minimus L.
24. " lividus Hwass
25. " nigropunctatus Sby.
26. " vitulinus Hwass
27. " magus L.
28. Strombus isabella Lam.
29. " luhuanus L.
30. " auris-dianae L.
31. " urceus L.
32. " floridus Lam.
33. " terebellatus Sby.
34. Cassis vibex L.
35. Terebellum subulatum Lam.
    var. punctata Chemnitz
36. Terebellum subulatum Lam.
37. Papuina brumeriensis Forbes
    (Land Shell)
38. Tubipora musica L.
    (Organ-Pipe Coral)
39. Colubraria distorta Schubert & Wagner
40. Turbo Chrysostomus L.
41. Opercula of "
42. Astralium calcar L. var. lacineatum Gould
43. Trochus fenestratus Gmelin
44. " niloticus L.
45. Cantharus furnosus Dillwyn
46. Natica solida Blainville
47. " marochiensis Gmelin
48. Polinices melanostoma Gmelin
49. Natica mamilla L.
50. " flemingiana Recluz
51. Oliva emicator Meuschen
52. Latirus turritus Gmelin
53. Vasum turbinellum L.
54. Bursa gyrina L.
55. " bufonia Gmelin
56. Mitra ferruginea Lam.
57. " adusta Swainson
58. " plicata Lamarck
59. " intermedia Kiener
60. Clava obeliscus Brug.
61. " aspera L.
62. Cerithium lemniscatum Quoy
63. " columna Sby.
64. " torulosum L.
65. Faunus ater L. (Fresh Water)
66. Columbella versicolor Sby.
67. Cymatium rubecula Lam.
68. Coralliophilla neritoidea Lam.
69. Drupa concatenata Lam.
70. " ochrostoma Blainville
71. Peristernia pulchra (Reeve)
72. " ustulata Reeve
73. Murex adustus Lamarck
74. Mitra muriculata Lam.
75. Cylindrica crenulata Gmelin
76. Mitra tabanula Lam.
77. " aureolata Swainson
78. " scabriuscula L.
79. " flammea Quoy
80. " telescopium Reeve
81. Turris unizonalis Lam.
82. Modulus tectum Gmelin
83. Pecten pseudo-lima Sby.
84. Tellina striatula Lam.
85. Lioconcha castrensis L.
86. Barbatia velata Rve.
87. Pinctada cumingii (Rve.)
88. Antigona reticulata (L.)
89. Nassa concinna Powis
90. " subspinosa Lam.
91. " mucronata A. Adams
92. Thais undata Chemnitz
93. Columbella australis Gaskoin
94. Drupa chrysostoma Desh.
95. Cantharus proteus Rve.
96. Coralliophila galea Chemn.
97. Peristernia incarnata Desh.

CLASS SCAPHOPODA

A report was made to the club on this group by Tom Burch at the January,1943 meeting. This was published in our Minutes #21, pp.5-9, and included a report on the organization,growth, method of living. In addition to the above paper information has been freely used from the following publications: Pilsbry and Sharp, Tryon's Manual of Conchology, vol.17,1897-98; John B. Henderson, A Monograph of the East American Scaphopod Mollusks, Bulletin 111, U.S. Natl. Museum,1920; Grant and Gale, Mem. San Diego Soc. Nat. Hist. vol.1,1931; Oldroyd, The Marine Shells of the West Coast of North America, Stanford Univ. Publ., 1927; Cotton and Godfrey, The Mollusks of South Australia, Part II,1940.

There are a few special terms used in describing Scaphopods that might well be explained here. The following apply to the genus Dentalium:

Posterior- that portion near the pointed or smaller end.

Anterior- that portion near the aperture or large end.

Primary Ribs- the first or original longitudinal ribs appearing on the tip of the shell.

Secondary Ribs- those later appearing or intercalated between the primaries.

" arc" of the shell- measure of the curvature of the shell determined by the distance in mm. from a line connecting the apex and aperture to the highest point above it in the concave arch of the shell.

The following terms are used in describing the genus Cadulus:

Dorsal- the convex side of the shell.

Ventral- the concave side of the shell.

Equator- the section of maximum diameter of the shell.

The class includes but two families- Dentaliidae and Siphonodentaliidae

Key to Families

a. Shell enlarging uniformly to the greatest diameter at the mouth; shell to some extent at least, sculptured; foot pointed,conical,surrounded by an epipodial process resembling a wing-shaped sheath, which is interrupted or slit, like the break in a fold, on the side next to the head; median tooth of the radula twice as wide as long..
DENTALIIDAE

aa. Shell inflated,generally contracted towards the mouth, smooth and glassy in texture, and without sculpture; foot vermiform, capable of expansion into a subterminal rosette-like disk, not interrupted dorsally; median tooth of radula in width less than double its length...
SIPHONODENTALIIDAE

The above key is taken from Cotton and Godfrey.

Family DENTALIIDAE

Genus Dentalium Linnaeus,1758. Type (by subsequent designation, Montfort,1810), Dentalium elephantinum Linnaeus (Amboyna).

The family DENTALIIDAE contains but one genus, Dentalium. This has been subdivided into a number of subgenera based chiefly upon the apical characters of the shell. The value of these apical characters for purposes of classification, and therefore the value of the subgenera based upon them, is not altogether assured. " The distinctions can not be sharply drawn, and some species listed under one heading may partake more or less of the characters of some other group" (Henderson).

We shall, therefore, ignore the subgenera of the genus Dentalium.

Key to Species of Dentalium

- a. Shell longitudinally strongly ribbed
  - b. Ribs typically 6, decreasing anteriorly ......neohexagonum
  - b' 6-ribbed at apex, increasing to 12, and at aperture with 17-24 alternating riblets; length 27 mm, about 9 x Diam. oerstedii
  - b'' Similar, but glossy with finer sculpture and more numerous riblets at aperture ....numerosum
  - b''' 12 to 20 sharp riblets at apex, 25-48 at aperture, the interstices wider than ribs, concave; length 29-65 mm., 9 to 15 times the diam . agassizii
- a' Shell with fine, evenly engraved longitudinal striae toward the apex (or in young specimens throughout); section circular
  - b Apex simple; without apical slits; length 25-30 mm; 10 times diam. semipolitum
  - b' Apex with slit on concave side; shell translucent whitish with opaque rings; length 30 mm, 16 times diameter .... inversum
  - b'' Apex with slit on both concave and convex side; length 38.5 mm, 12 times the diameter .... hannai
  - b''' Low rounded threads near apex some of which are more prominent; occurs in deeper water and are larger than above, vallicolens
- a'' No longitudinal sculpture
  - b. Strong and solid, young striated .... pretiosum
  - b' Quite thin; deep water species; no apical notch
    - c. Slender with very slight curvature, and slow increase
      - d. Very slightly curved, very slender; length 30 mm, 16-19 times the diameter .... watsoni
      - d' Almost straight, very glossy; length 30-40 mm, 12-15½ times the diameter .... rectius
      - d'' Curvature regular but slight; length 45 to 69 mm, 11 to 14 times the diameter .... dalli
  - b'' Shell subcircular in section
    - c. Well curved, polished, flesh-tinted toward the apex, which is sometimes slit in front and behind; length 45 mm, 12 times the diameter .... splendidulum

In taking up our discussion of the species the following note is of interest from a letter of Dr.A. Myra Keen (Per. Comm. Jan.1945) " I was surprised to find how few of the scaphopods have definite type localities. . Dr. Pilsbry in the Pilsbryand Sharp monograph cited types for most of the species but neglected to tie type to locality. A check of specimens, most of which are in the National Museum will be necessary. I caught a few of them while I was there but evidently didn't have time to be thorough on anything but pelecypods."

Dentalium neohexagonum Pilsbry and Sharp,1897. " Monterey to Guacomayo, Central America" (Dall). Type locality not given (several localities in southern California cited).

Collecting data: This is our common siz sided species. It is often spoken of as a shallow water species. However, we have dredged it from as shallow as a few fathoms off shore to as deep as 100 fathoms off Redondo Beach. The deeper water specimens are as a rule larger. The species is very abundant in some of the Pleistocene deposits.(Burch);25-40 fms. Monterey; 50 fms. off Ensenada,Mex.; Malaga Cove in 15 fms.; San Pedro in 25 fms.; Rocky Pt. in 40 fms.; (Burch); 9-40 fms. in Monterey Bay, abundant (Smith); 12-15 fms. San Diego; 5-10 fms. off S. Coronado Id. (Baker); San Pedro in 20 fms. (Lowe);

An interesting short paper on this species is D.K. Greger, " Notes on a collection of Dentalium neohexahonum P. & S.", Geological Mag., vol. 71, May 1934, pp 236-7.

Dentalium oerstedii Morch,1861. Pilsbry and Sharp in their monograph list this species from Guaymas to Panama and the Galapagos. It is of interest to us because of the possibility that the species we know as numerosum may be no more than subspecifically distinct if that. Pilsbry and Sharp discuss the species at length pp.24,25 and pl. 10, figs. 60,61,62,63,64. The original description is not published in Oldroyd and for convenience the translation of Morch's diagnosis in Malak. Blatter, vii, p.177(1861) follows: " Shell arcuate, rather solid, somewhat shining white or yellowish, hexagonal at apex. Aperture circular,having 12 lirae, the interstices smooth posteriorly, but toward the middle divided by a riblet, whence to the aper--ture there are 24 lirae. Growth lines here and there more raised, nearly variciform. Length 27, diam. 3 mm."

Dentalium numerosum Pilsbry and Sharp,1897. Redondo Beach, Calif. (Burch) to Panama and the Galapagos (Dall). Type locality fide Oldroyd is Coronado Islands. However, Dr. A. Myra Keen suggests " Type locality not specified; probably Cerros Island, 44 fathoms".

This species is usually assigned to Dall as aûthor, but having been first published in the Manual of Conchology, vol.17 it seems that it should be written D. numerosum Pilsbryand Sharp,1897, ex Dall MS.

The description of this species as published by Pilsbryand Sharp is reprinted in Oldroyd vol.II, p. 12 with the exception of the following note " This name, which Dall used to cover the entire species, as found from Lower California to the Galapagos, may be utilized in a restricted sense for the northern form." Pilsbry and Sharp considered numerosum as a variety of oerstddii.

Collecting data: Redondo Beach, Calif. in 25 fms. gravel and in 75 fms. fine gravel and mud; Todos Santos Bay, in 50 fms.; (Burch); South Coronado Island in 18 fms. (Dr. F. Baker); Acapulco in 20 fms.; Guaymas in 20 fms ; Pta. Penasco in 10 fms.; Conception Bay in 15 fms.; Magdalena Bay in 10 fms. (Lowe);

Dentalium agassizii Pilsbry and Sharp, 1897. " Santa Barbara Islands, Calif to Panama" (Dall). Type locality, Gulf of Panama.

The reason this species has not been reported by any of our members is no doubt that it is below our deepest dredgings. The California records given by Pilsbry and Sharp are " Santa Barbara Islands, Calif.,414 fms.; off San Diego, Calif. 822 fms."

Dentalium semipolitum Broderip and Sowerby,1829. Monterey, Calif. (Allyn Smith) to San Lucas, Costa Rica (Valerio). Type locality, not specified .

This is our common round form with striations near the apex which dissapear toward the aperture.

Collecting data: Off Redondo Beach in 25 fms.; Horshoe Kelp off San Pedro, Calif. in 25 fms.; (Burch); Monterey Bay in 9-35 fms. in coarse to fine sand, scarce (A. Smith); San Juan del Sur, Nicauragua; San Pedro, Calif. in 20 fms.; (Lowe); San Felipe, L.C. (F. Stephens); Pta. Penasco, Sonora,Mex. (Huey); Acapulco, Mexico (Dr. B.R. Bales); South Coronado Island in 18 fms. (Dr. F. Baker).

Dentalium hannai Baker,1925. Proc. Calif. Acad. of Sci., Fourth Series, Vol. 14, No.4, pp. 83-87, pl. 10, July 23,1925. Type locality, off South Coronado Island.

This species is said to differ from semipolitum only in having a slit at the apex. It has been very generally placed in the synonymy of semipolitum Mr. George Willett states that out of 25 specimens taken off San Pedro, 9 were hannai and 14 were semipolitum. Mr. Willett suggests that the slit may be but a secondary sex character. However, there are discussions of these slits in other periodicals giving a number of explanations. Mr. Allyn Smith sent in the following note: In 1939, Dr. Pilsbry wrote, in answer to a question:" The apical slit is apparently not sexual, since it is invariably present in some species, never present in some, and occasional in others, and of very variable length. Moreover, no special organ leads to it. Anal and sexual excretion is into the posterior cavity of (the) mantle, whichopens by a circular orifice in some, a notched one in other forms. Slits seem to have little significance in many species, and I agree that D. hannai is not specifically distinct from semipolitum as the only difference seems to be the slit. D. inversum, with slit on the concave side, seems distinct, though a few show no slit." (Letter, 31-I-1939). He also says that the slit " is not comparable to an aperatural sinus, such as the slit of Pleurotomaria or Turridae, as it is formed by dissolving away at the small end of the shell as the animal grows, and this process seems to act irregularly."

While we are disposed to consider hannai identical with semipolitum it has been our custom to copy the original descriptions of all species not included in Oldroyd. Therefore Dr. Baker's diagnosis of hannai follows: " Shell moderately curved, of medium size, very narrow at the apex but increasing rather rapidly at first, less decidedly later; length about 12 times the diameter, translucent, shining, blue-white at the anterior end and becoming slightly creamy on the posterior half; sculpture of the earlier third consisting of 28 fine,sharp,subequal ribs about a third as wide as interspaces, and all continuous, but gradually fading out at about a third of length of shell; growth striae wavy and irregularly marked throughout; anal aperture, a slit on both convex and concave sides, but shorter and rounded on the latter, sharply pointed on the former; sides of apex grown inward, the slit occupying about a third of the diameter at this point; these inward projection of shell substance can hardly be called " a plug" in the sense that this word is commonly used in Scaphopoda; aperture circular, intersecting the axis at a right angle; peristome thin. Length 38.5 mm.; diameter of base 3.2 mm; diameter of apex o.6 mm.; length of slit, convex side, 1.5 mm, concave side o.6 mm."

Collecting data: San Pedro, Calif., Malaga Cove, L.A. Co., Calif. in 10 fms.; S. Coronado Island in 15 fms. (G. Willett); San Diego,Calif. in 20 fms. and Coronado Islands in 10-14 fms. (Dr. F. Baker).

Dentalium inversum Deshayes,1825. " Bering Sea to Panama in increasingly deep water" (Dall,1921). Type locality unknown. Type said to be in Paris. . This species was not figured by Mrs. Oldroyd nor mention made of the fact that it is well figured by Pilsbry and Sharp in their monograph on p.95, pl. 21, figs. 47-49.

Miss Viola Bristol of the San Diego Museum sent in the following note " Dr. Fred Baker in one place in his index said " The description except the slit seems more like D. sectum. It could be new". In another place he said " A fact not noted by Pilsbry and Sharp is that the slit instead of being centered on the concave side, is always slightly to the right when the shell is held with the tip away and concave side up."

However, the above note does not mention the characters described for D. sectum in regard to the " narrow slit across an obliquely conic,smooth plug". It is generally considered that inversum is a distinct species.

Collecting data: Jalisco,Mexico in 30 fms. (G. Willett); Acapulco in 20 fms; Mazatlan and Manzanillo in 20 fms.; Magdalena Bay in 10 fms.; San Felipe; Conception Bay in 15 fms.; San Carlos Bay; Pta. Penasco in 10 fms.; (Lowe); Gulf of California (Baker).

Dentalium fisheri Pilsbry and Sharp,1897, ex. Stearns MS. This species was listed by Dr. Dall in Bulletin 112 but the consensus of opinion is that it is of the southern fauna and not of California.

Collecting data: Pta. Penasco, Sonora in 10 fms.(Lowe); Tres Marias Islands (Baker).

Dentalium vallicolens Raymond,1904. " Fuca Strait to Gulf of California" (Dall,1921).

Mrs. Oldroyd gives the type locality of the species as " Station 12, submerged valley off Redondo Beach,Santa Monica Bay in 145 fms." This was the first locality mentioned by Raymond. However, he did not designate it as the type locality. Dr. Fred Baker in Proc. Calif. Acad. Sci. 4th ser. vol.14, no.4, p. 85, pl.10 figures specimens from off La Jolla, Calif. in 110 fms. and designated them as types (No. 1758 in the Calif. Academy). Dr. Baker stated that Raymond designated no type material. Dr. A. Myra Keen advises on this " Dr. Baker was correct in saying that no types or type locality was designated, and the material he selected will stand. Mrs. Oldroyd always assumed in such a case that the first locality cited was automatically the type locality; hence the numerous changes I have had to indicate in these notes. Raymond happened to describe the Redondo localion first, as she quotes it, but he does not indicate this as the type area."

This is our largest species and has longitudinal striations that fade out anteriorly.

Collecting data: Off Redondo Beach, Calif. in 50 to 125 fms. in mud and gravel. This species was to be found in a certain type of bottom composed of fine gravel and mud. We could tell before we washed it, the second we saw the dredge come up, whether or not we had vallicolens material as we came to call it. Another odd thing is that these localities are very limited in extent and difficult to locate. We had our bearings laid out with care and would take shots at all of our land marks with the sextant and at the exact spot drop our dredge with the result that if we hit the spot one time out of five we were doing well. The boat would drift a very little and the adjoining material seemed to be barren comparatively. It should be mentioned that this vallicolens material carried a very rich fauna in addition to the Dentalium. (Burch). ; off San Diego in 120 fms. (Baker); ; 161-265 fms. off Point Pinos, in mud (USFC Sta. 4462), a fragment; two specimens from off La Jolla in 100 fms.(A. Smith).

Dentalium pretiosum Sowerby,1860. Forrester Island, Alaska to San Diego. The variety indianorum Carpenter is placed in the synonymy by most authors.

There has been a great deal written about the use of this species by the Indians as money. However, Dr. A. Myra Keen in a recent letter gives a new story about it " Concerning habits of Dentalium pretiosum: According to A.P. Kashevaroff, Curator and Librarian at the Alaska Historical Library and Museum, (letter dated Dec. 16,1936), this shell was widely used by the Indians in trade as far north as Point Barrow and eastward to Diomede Islands. The Russians used it for trade with the aboriginees of Alaska and a string 18 inches long was worth a whole sea otter skin. Often too, the shells were sewed to clothing. The greatest use was around southeast Alaska. In Klebnikov's biography of Alexander Baranoff the following manner of procuring the shell is cited: " Some dead body of a slave or animal was thrown into the lake where it was left for a number of days and that mollusk would feed on the dead body and would get attached to the meat in great numbers. After the body was pulled out the mollusk was gathered."

This sounds a little peculiar in view of the fact that Pilsbry says the Mediterranean form shuns any kind of mud containing decomposition products and that it prefers clean and rather coarse sand. Also the reference to a " lake" is puzzling. Perhaps more than one kind of mollusk was used as wampum."

Collecting data: Forrester Island, Alaska; Sitka, Alaska in 10 fms.; Catalina Island in 60-80 fms. (G. Willett); Strait of Juan de Fuca (Eyerdam); Puget Sound (Dr. F. Baker); off Monterey(Cooper). 20 fms. off Carmel (Stillwater Cove), in sand; rare (A. Smith)- " The Carmel specimens are longer, more slender, more widely curved, and more pointed than typical shells from Alaska. One has a slit on the outside of the curve, a feature not present in any pretiosum I have seen. They hardly seem like pretiosum and I have only tentatively labeled them as such. I have seen no typical pretiosum from Monterey."

Dentalium rectius Carpenter,1864. " Stephens Passage, Alaska to Panama Bay" (Dall,1921). Type locality, Puget Sound.

Collecting data: Off Redondo Beach, Calif. in from 25 to over 100 fathoms in mud bottom. Most abundant around the 50 fathom mark.; Todos Santos Bay in 50 fathoms mud; (Burch); Craig, Alaska in 50 fms. (up to 68 mm); Wrangel, Alaska in 50 fms.; San Pedro, Calif. in 100 fms.; (G. Willett); San Juan Islands, Wash. (W.J. Eyerdam); Orcas Island, Puget Sound in 10-30 fms.(Dr. F. Baker); DeCourcany Id., B. Columbia in 30 fms. (Oldroyd); 35-70 fms. in mud in Monterey Bay, common (A. Smith).

Dentalium watsoni Pilsbry and Sharp,1897. " Tillamook, Oregon to San Diego" (Dall,1921). Type locality not specified.

This species is described as being longer and more slender than rectius. Pilsbry and Sharp state " As straight as D. rectius but very much more slender. " We have specimens so labelled from off Redondo Beach in 125 fathoms. It is interesting to note that these exceptionally long shells came from deeper water. Our set labelled watsoni has been the source of a great deal of discussion by the local members of the club. Mr. George Willett submitted a set of rectius from Alaska. An interesting observation of both Mr. Willett's set and our set from off Redondo Beach is that the long specimens from either set will fit the described measurements of watsoni (16-19 times the diameter) but if you break off one of the long specimens at the right spot you then have the measurements of rectius(12-15½ times the diameter). Young specimens measure rectius and the older ones measure watsoni. Therefore, the theory is advanced that after a specimen of rectius attains a certain size and continues to grow, the growth in diameter does not increase in proportion to the growth in length resulting in watsoni. There may be other differences between these species. None of us have seen the type, and the above statement is made merely as an observation rather than an effort to question the validity of the species.

Dentalium dalli Pilsbry and Sharp,1897. " Pribilof Islands, Bering Sea to Point Aguja,Peru " (Dall,1921). Type locality not specified.

Collecting data: Drier Bay, Knight Id., Pr. Wm. Sound, Alaska in 15 fms. mud, 1923 (W.J. Eyerdam); Jesse Island, British Columbia,Alaska (Lowe) Shaw Island, Puget Sound in 30 fms.(Oldroyd); Lower Calif. (Baker).

Dentalium splendidum G.B. Sowerby,1832. Proc. Zool. Soc. London,1832,p.29. Figured in - " . Thes. Conch.,iii,p.98,pl.225,f.41; Conch. Icon. 18 pl.5,f.30; Pilsbry and Sharp, Manual of Conch. vol.17,1897,p.96, pl.15,f.38. The original description follows: " Dent. testa tenui,polita,basi carnea, apice majori lactea; apertura postice fissuris duabus, altera dorsali,altera ventrali: long. 1 8/10, lat. 3/20 poll. Hab. ad oras Americae Meridionalis. (Xipixapi, West Columbia (i.e. Ecuador). Dredged in from ten to sixteen fathoms water, on a sandy muddy bottom.

There is no definite record of this species in our fauna. However, Mr. George Willett has taken specimens in 25 fms. off South Coronado Island that are close to this species and may be so classified. Therefore the above references are included for convenience of those interested.

Family SIPHONODENTALIIDAE

The family Siphonodentaliidae contains three genera, Entalina, Siphonodentalium, and Cadulus

Entalina and Siphonodentalium have the greatest diameter at the aperture; Cadulus has the section of greatest diameter or equator, posterior to the aperture. The angled apex and sculptural features of Entalina suggest a true Dentalium but the form of the foot and other anatomical features indicated a position under Siphonodentaliidae. We have no representative of this genus described from this coast.

Siphonodentalium is a widely distributed genus of few species confined to deep water except in high latitudes. Dall,Oldroyd and others place Cadulus quadrifissatus Pilsbry under the genus Siphonodentalium in spite of the fact that it was described as a Cadulus by Pilsbry and definitely does not answer the description of a Siphonodentalium as the largest diameter is not at the aperture. Another ~~factor pointin~~g away from Siphonodentalium is the shallow water in which it is found-- 10 fathoms up. Henderson records the East American species as ranging from nearly a hundred fathoms to well over a thousand fathoms with most coming from around five hundred fathoms. Perhaps when more dredging has been done at these depths corresponding species may be found.

Genus Cadulus Philippi,1844. Type (by subsequent designation,Hermamsen,1846), Dentalium ovulum Philippi.

As a rule the species of the genus Cadulus are not very widely distributed. The aperture is usually somewhat contracted, usually very oblique, and never the section of greatest diameter of the shell. The genus has been divided into subgenera which Henderson says are of doubtful value. In a general way it may be said that the large and medium sized species fall under Platyschides, the small and slender forms under Gadila, and the small bulbous species under Cadulus s.s., while those of very prominent apical slits are Polyschides. (Henderson).

Almost all of our species of Cadulus belong to the subgenus Gadila; Cadulus californicus is a Platyschides; and Cadulus quadrifissatus is a Polyschides.

Key to Species of Cadulus

a. Posterior end with notches or slits
  b. With 4 slits; shell slowly tapering, hardly inflated,
    quadrifissatus
  b'. With 2 slits; shell stout and inflated; largest equator nearer aperture and more distinct than in C. tolmei,
    californicus
a'. Posterior end without notches or slits
  b. Shell rather stout; equator further from aperture and less distinct than C. californicus .... tolmei
  b'. Very slender with slight inflation anterior; contraction toward the mouth very short,
    c. Shell smooth throughout,
      d. Length 13.5; 10 x diameter .... aberrans
      d'. Length 10.3; 9 x diameter .... fusiformis
      d''. Length 10; 7 x diameter .... hepburni
      d'''. Length 8.6; 4½ x diameter .... stearnsii
    c'. Shell circularly corrugated near apex,
      perpusillus

Cadulus quadrifissatus Pilsbry and Sharp,1898, ex Carpenter MS. Monterey (Keen)(Perry) to Tres Marias Islands (Hanna and Strong). Type locality, San Diego, Calif. in 10 fms.

This species is easily recognized by the prominent apical slits. Dr. A. Myra Keen (Per. Comm. Feb. 1945) " I agree that this should probably be returned to Cadulus." The species is almost identical with the C. quadridentatus of ~~the An~~etillean fauna.

Collecting data: Off Malaga Cove, L.A. Co., Calif. in 10 fms.; off Redondo Beach in 15-25 fms.; Avalon, Catalina Id. in 25 fms.; Ensenada,Mex. in 10 fms.: (Burch); San Pedro, Reef Point, South Coronado Id. in 10-20 fms.(G. Willett); San Pedro in 30 fms. (Lowe); Del Mar, Calif.(Stephens); San Diego (Hemphill); S. Coronado Id. in 6 fms., also 10 fms.; Coronado Beach in 7-14 fms.; Ballast Piint,San Diego Bay (Baker).

The species seems to prefer shallow sandy bottom rather than mud.(Burch Specimens from different localities show a great deal of variation. It is probable that a specialist on the group will sooner or later divide this species into several species or subspecies. (Burch).

Cadulus californicus Pilsbry and Sharp, 1898. " Clarence Strait, Alaska to Manta, Ecuador " (Dall, 1921). Type locality: Station 2923, off San Diego, Calif. in 822 fathoms.

There has been a great deal of confusion regarding this species and C. tolmei. It is the largest described species from our fauna. Pilsbry and Sharp state, p. 181 " A large stout species, much exceeding C. tolmei, C. clavatus and C. dalli in size, and more swollen and robust than either . The equator is nearer the aperture and more pronounced than in C. tolmei." However, the remarkable differences between authentic specimens of this species add to the difficulties. Pilsbry and Sharp, p. 181 state " It varies considerable in inflation, some specimens (f.8,7) being decidedly less swollen than that selected as type (f.5,6.)". Tom Burch in Min.21, p. 8, states " Cadulus tolmei is described as having a simple apex, while Cadulus californicus is described as having a notched apex. If the tip of a specimen of Cadulus californicus were broken off, it would answer the description of Cadulus tolmei perfectly. The Lowe collection in the Natural History Museum of San Diego has three specimens labelled Cadulus californicus from 60 fathoms off San Diego, and four specimens labelled Cadulus tolmei from 634 fathoms off San Diego. The latter appear to me to be merely Cadulus californicus with the tips broken off which gives them the appearance of having the equator further posterior. Only one specimen of Cadulus tolmei seemed to be a live specimen and it was obviously broken."

Collecting data: Dredged in abundance off Redondo Beach in 150 fathoms mud with an occasional specimen showing up in material from as shallow as 75 fathoms (Burch); off Catalina Island in 200 fathoms (G. Willett); Point Loma, San Diego in 62 and 80 fathoms (Baker).

Cadulus tolmei Dall, 1897. - " Vancouver Island to San Quentin Bay, Lower California" (Dall, 1921). Type locality, Victoria, B.C. in 60 fms.

Dr. Dall's original description of this species is republished in Oldroyd, vol.2, p.16 and Dall's figure reproduced Pl.1, fig.9. No reference is made to the fact that the species was redescribed and refigured by Pilsbry and Sharp p. 181,182, pl.34, figs. 1-4. It is interesting to note that not only do the two figures seem to differ slightly but that the published dimentions of the specimen figured by Pilsbry and Sharp differ somewhat from Dall's dimentions. The Pilsbry and Sharp figures are very clear though and should be studied by those interested in the species.

Collecting data: Off Redondo Beach in 150 fms. mud bottom (Burch); Catalina Island in 200 fms. (G. Willett); 634 fathoms off San Diego (Lowe); 627 fms. off Monterey, in blue mud (USFC Sta. 3238) rare (A. Smith).

Cadulus tolmei newcombei Pilsbry and Sharp, 1898. Man. Conch. vol.17, p.182, Pl.34, f. 1,2. Type locality, same as tolmei above.

This variety seems to have been rather generally ignored. Most authors do not even mention it in the synonymy. However, H.N. Lowe and others have considered it a good subspecies. Mrs. Oldroyd did not mention it. The original description follows: " About the length of tolmei, but decidedly more slender, greatest diameter contained nearly 6 times in length, section of the tube markedly oval, compressed vertically throughout; aperture oval. Length 11.0; antero-posterior diam. at aperture 1.45, at greatest bulging, 1.66, at apex o.66 mill.; lateral diam. at aperture 1.55, at largest 1.9, at apex o.75 mill."

Collecting data: Charter Bay, British Columbia (Lowe).

Cadulus aberrans Whiteaves, 1887. Quatsino Sound, British Columbia to San Clemente Island, Calif. (Lowe). Type locality, Quatsino Sound, B.C.

Mrs. Oldroyd gives the original description of this species but no figure. It is figured by Pilsbry and Sharp pl.35, fig.16. In connection with the description Whiteaves made the following comments which are not reprinted in Oldroyd:" This little shell, which is, nevertheless, of large size for the genus, looks not unlike an immature Dentalium, and, at first sight, specimens of it might easily be mistaken for half-grown examples of D. pretiosum Nuttall, which the Indians say occurs at the same locality. It may, however, be distinguished from any Dentalium by its thin test and highly polished outer surface, though the wwelling of the shell in advance of the middle and the constriction behind the aperture which are usually marked characters in the genus Cadulus, are reduced to a minimum in this species, and in most specimens are quite imperceptible."

C. aberrans, fusiformis, and hepburni are very much alike and tho difficulty in this group is to avoid confusing these three species.

Collecting data: We have specimens which have been tentatively assigned to this species dredged off Redondo Beach in 25 fathoms. They have not been compared to type specimens. (Burch); off San Clemente Island, Calif. (H.N. Lowe); Departure Bay, B.C. (Lowe);

Cadulus fusiformis Pilsbry and Sharp, 1898. " Monterey, Calif. to Cape San Lucas" (Dall, 1921). Type locality, San Pedro, Calif.

Collecting data: Monterey, Calif. in 10-25 fms.; Redondo Beach in 25, 50, 75, and 100 fms.; Santa Monica, Calif. in 15 fms.; Malaga Cove, L.A. Co. in 10 fms.; Rocky Point, L.A. Co. in 40 fms.; Horshoe Kelp off San Pedro in 25 fms.; Todos Santos Bay in 50 fms.: (Burch); San Pedro and San Diego in 10-25 fms. (G. Willett); 10-40 fms. in Monterey Bay, in sand, abundant (A. Smith); San Pedro in 30 fms. (Lowe); San Diego in 15 fms.; Ballast Point, San Diego Bay in 5 fms.; off Hotel del Coronado in 12-15 fms.; Pacific Beach; (Baker).

Cadulus hepburni Dall, 1897. Drier Bay, Knight Island, Alaska (Eyerdam) to Catalina Island, Calif. (Willett). Type locality, Victoria, B.C.

Mrs. Oldroyd reproduced the original figure on pl.1, f.13. The species was redescribed by Pilsbry and Sharp, p.194 and refigured pl.35, f.19,20. " The contraction toward the aperture is very slight, and mainly confined to the convex side." " While quite slender, it is still somewhat stouter than C. aberrans; and C. fusiformis is less curved and less constricted at the aperture." A study of this contraction toward the aperture brings out some very puzzling variations.

Collecting data: Drier Bay, Knight Island, Alaska (W.J. Eyerdam); Forrester Island, Craig, Ketchikan, Alaska in 20-40 fms. (Willett); Catalina Island in 30 fms. (Willett); 43-45 fms. off Santa Cruz, in soft green mud (USFC Stas. 4482,4483). Also , 80 fms. off Point Pinos, a single specimen (Gordon); " A very scarce species, apparently in Monterey Bay" (A. Smith).

Cadulus stearnsii (Pilsbry and Sharp) 1898. " British Columbia to San Quentin Bay, Lower California" (Dall, 1921). Type locality, off Tillamook Harbor, Oregon.

This species was described in the Pilsbry and Sharp monograph, p.125 as Dentalium simplex Pilsbry and Sharp, and on page 253 they renamed it D. stearnsii because the name simplex was preoccupied by D. simplex Michelotti, 1861. It was figured on pl.27, figs. 88,89.

Collecting data: Off Redondo Beach in 75-100 fms.; off Rocky Point, Los Angeles Co. in 40 fms. mud bottom (Burch).

Cadulus perpusillus Sowerby, 1832. " Monterey, Calif. to Panama" (Dall) Dr. A. Myra Keen advises that Dall also reported the species from Guayaquil making the range -3 to 37. Type locality is Puerto Salango, Ecuador.

If this species has ever been figured anywhere we have failed to find the record of it. It was unfigured in the original publication and Pilsbry and Sharp do not figure it. They discuss it on p. 190,191. It is in the group of C. dentalinus. The first inclination on sight is to put specimens of this species in with the Caecum. It is transversely striate. Pilsbry & Olsson, Proc. Acad. Nat. Sci. Phila. vol. 93, p 49, 1941 discuss this species placing it under the subgenus Gadilopsis. It is surprising that it is not in a distinct genus.

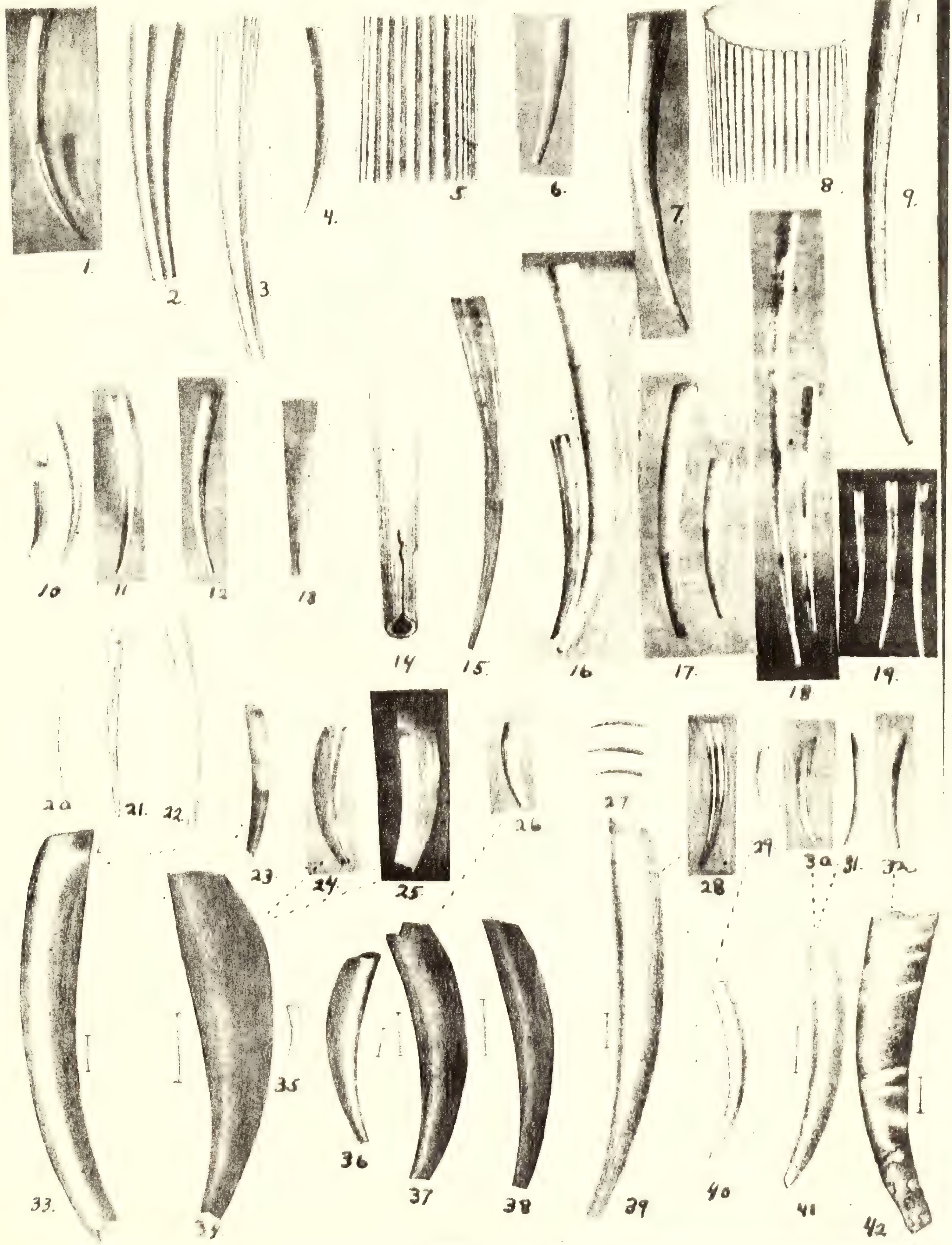
Collecting data: Off Redondo Beach, Calif. in 25-50 fms. (Burch); 36-39 fms. off Point Pinos, in soft green and dark gray mud and rocks (USFC Stas. 4464,4483) scarce (A. Smith).

Figure EXPLANATION OF PLATE

1. Dentalium neohexagonum Pilsbry & Sharp- 25 fms. Redondo Beach, Calif. gravel and sand bottom- length of larger specimen 35 mm. pp.9,10.
2. Dentalium neohexagonum Pilsbry & Sharp- Manual of Conch. v.17,pl.11,f.76
3.Dentalium numerosum Pils. & Sharp- " " " pl.10,f.71
4. " " " " " " f.72
5. " " " " " " f.73
6. " " Coronado Island,18 f. (Baker Coll.) 11 mm.
7. Dentalium oerstedii Morch,-Guatulco Bay,Mex. 30-40 f.(Willett) 24 mm(yng.
8. Dentalium agassizii Pils. & Sharp- Manual of Conch. vol.17,pl.12,f.90
9. " " Oldroyd, vol. II, pl.1, f.1.
10.Dentalium semipolitum Brod. & Sby.- Manual of Conch. vol.17, pl.16,f.54
11. " " Acapulco,Mex. (Bales Coll.) 27 mm.
12. " " San Pedro, Calif. (Willett) 28 mm.
13.Dentalium hannai Baker- Proc. Cal. Acad. Sci. vol.14,pl.10,f.5
14.Dentalium inversum Deshayes- Manual Conch. pl. 21, f.47
15. " " Tenacotita Bay, Mex. 30 f.(Willett) 30 mm.
16. Dentalium vallicolens Raymond-Redondo Beach,75f.MG(Burch) 60 mm.
17. Dentalium pretiosum Sby.- Forrester Island,Alaska (Willett) 38 mm.
18. Dentalium watsoni and D. rectius,Craig, Alaska (Willett) From set mentioned on p. 13. Long specimen 67 mm x 3.5 mm. length is 20 x diam. short specimen is 37 mm x 2.5 mm or 15 x diam.
19. Dentalium rectius Carpenter- Redondo Beach, 75 f. mud
20. Dentalium watsoni Pils. & Sharp- Manual of Conch., vol.17,pl.21, f.44
21. Dentalium rectius Carp.- " " " f.45
22. Dentalium dalli Pils. & Sharp- " " " f.46
23. Cadulus quadrifissatus Pils. & Sharp- Malaga Cove, 10 f,sand, 11 mm
24. Cadulus californicus Pils. & Sharp- Redondo Beach, 150 f, mud, 10 mm(Burch
25. " " but with portion of each end broken off 8 mm
26. Cadulus tolmei Dall (?), Catalina Island,200f (Willett), 6 mm resembles fig. of C. calif.more than C. tolmei.
27. Cadulus aberrans Whiteaves- C. hepburni Dall, & C. tolmei, from above downfrom photograph of specimens from type lots,natural size (D.K.Greger
28.Cadulus fusiformis Pils. & Sharp- Rocky Point,40f,mud, 11 mm (Burch).
29.Cadulus aberrans Whiteaves-(?) Departure Bay, B.C. 5.5 mm.
30. Cadulus hepburni Dall- (?) Redondo Beach 75 f mud, 8 mm (Burch).
31. " " from Timm's Point, San Pedro,Pleistocene 8.5 mm (Burch)
32. Cadulus stearnsii (Pils. & Sharp)- Redondo Beach, 75 f, mud, 9 mm(Burch
33. Cadulus quadrifissatus - Manual of Conch. vol.17, pl.29, f.10
34. Cadulus californicus- " " " pl.34, f.5
35. " " Oldroyd, vol.2, pl.1, f.8
36. Cadulus tolmei- Manual of Conch., vol.17, pl.34, f.3
37. " " Oldroyd, vol.2, pl.1, f. 9 (will some one check and see if this is actually Dall's original figure.)
38. Cadulus tolmei newcombei- Manual of Conch. vol.17, pl.34, f.1
39.Cadulus fusiformis- " " " pl.35,f. 14
40. Cadulus aberrans- " " " pl,35, f. 16
41. Cadulus hepburni- " " " pl.35, f. 19
42. Cadulus stearnsii- " " " pl.27, f. 88

SCAPHAPODA

PLATE I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The Nautilus, Vol.58, Jan. 1945, No.3 has been received! This issue is of much more than usual interest to us. Perhaps the most startling paper is by Katherine V.W. Palmer " Molluscan Types in the Carpenter Collection in the Redpath Museum." These types have been located in the Peter Redpath Museum, McGill University, Montreal, Canada. The list is too long to review here, but when these types are made available and properly figured, it is expected that there will be no little shuffling of names in several lists of synonymy. A number of recent authors have described species as new on the theory that Carpenter's descriptions were inadequate and his types lost. The discovery of these types will have an effect that is obvious. A number of the types in this list are among those listed by Mrs. Oldroyd and others as " British Museum ?". It is reported that all of this lot of Carpenter's types have been photographed and will be published in the future. We look forward with great interest to this publication. Unfortunately it seems that all of Carpenter's lost types are not included.

Another paper of interest to us is by Avery Ransome (Grant) Test, " Description of New Species of Acmaea". Among the several new species described is *Acmaea cona* Test,1945. The type series came from Point Firmin, San Pedro, Calif. and will be placed in the California Academy of Sciences. The description is not figured but from the description there is no doubt but that we all of us have the species in with our *Acmaea scabra* at this time. We will be interested in the report from the first of our members having an opportunity to compare material with the type lot of *cona*.

In the Notes and News L.G. Hertlein and A.M. Strong rename two species. They propose *Lucina undatoides* Hertlein and Strong to replace *Lucina undata* Carpenter, and *Tellina liana* Hertlein and Strong to replace *Tellina panamensis* as used by Li.

The March Bulletin of the Natural History Museum of San Diego is at hand. Among many interesting notes we see several new aquisitions of shells. One lot containing species not hitherto represented in the museums collection from Ensign Robert Lando, U.S.N. in the Philippines; and another lot sent from the Milne Bay area of New Guinea by Chaplin D. Evor Roberts, U.S.N.

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The following note from Dr. A. Myra Keen of Stanford University is of interest " Major Schenck is now Lieutenant Colonel Schenck. As he has a new APO number, I take it he is no longer in New Guinea. I shall probably be ready to send you the list of New Guinea species in a month or so. More boxes are supposed to be on the way,and a new recruit in conchology remains there to continue Dr. Schenck's mission of getting a complete representation from that one section of the New Guinea coast. To date there are upwards of 150 species. " .... " In the last Minutes you mentioned a letter from J.M. Dowdle that reached you from the South Pacific in five days. I can top that record-- recently a letter from Dr. Schenck came in three. It was postmarked in New Guinea at 8 A.M. Jan.23 and was put in my box at 8:30 A.M., Jan.26. However, that was exceptional. One cannot count on getting an answer short of three to four weeks. " ... " The shells we were promised from New Guinea are beginning to arrive,and what shells/. Large as our Indo-Pacific collection is, we have added one genus, one subgenus, and at least a dozen species already in this New Guinea stuff,and I havent finished the identifications yet."

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Aurora Trethewey, 1129 Alberta Place, San Diego, Calif. We are glad to welcome her to our group.

We were glad to hear again from our former active member. The following is an excerpt from a letter of Sgt. Woodbridge Williams, Pub. Rel. Sec., Sarasota Army Air Field, Sarasota, Florida to Dr. S.S. Berry, Sept. 10, 1944.

BALANCED MARINE AQUARIA

These small aquaria which I have been keeping have proved fascinating. In my mind they pretty well disprove the old notion of biologists that marine creatures are hard to maintain unless one has a Naples Marine station or Steinhart Aquarium. There are a number of green angiosperms which live in the sea making up large beds of grass, similar to the eel grass in California. Some of these grasses will grow in aquariums, especially those from warm water bays with a lower O_2 content. These along with a number of algae, such as Ulva, make excellent oxygenerators, and can be utilized to prepare balanced marine aquaria.

I have successfully maintained a number of mollusks, such as Bullaria, which every other day lay egg masses on the glass, Anachis, Modiolus, which developed from larvae in the water, hermit crabs, masking crabs, blenny fishes, sea horses, starfish, and sea urchins. In one jar with a sand bottom, a number of interesting annilids have developed, building sand tubes along the glass sides with long hydra-like tentacles.

I also have an interesting chiton, (Lepidochiton ?), which seems to do very well in a gallon aquarium. I never realized what great burrowers chitons were. This fellow digs down into the sand during the day, clinging to the glass and comes out in the evening on the surface to feed. Sarasota Bay is made up entirely of sand flats. I find chitons on the bladeso of the grass in the bay and living under isolated dead clam shells. I had always connected chitons with a rocky situation, and wondered how these fellows got about in so much sand, but now I understand; it is no more of a problem to them than it is to an annilid worm.

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In the last issue of the Proceedings of the Malacological Society of London under the names of deceased members appeared the name F. Haas. So we hastened to write the Chicago Natural History Museum to inquire and are very happy to report that " In the words of Mark Twain, " The news of my death is a little bit exaggerated". He is enjoying good health and is carrying on his work in his usual excellent manner. And we have a very flattering letter from Dr . Haas about our recent work.

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Mrs. Agnes E. Wolf, Room 511, The Pennsylvania, St. Petersburg, Florida.

We wish to thank Mrs. Wolf for her contribution to our fund and welcome her to our group.

Mrs. C.D. Kinsman, R #1, Box 191, Miami, Florida. Again we thank Mrs. Kinsman and note with interest " We have a growing collection of shells and would be very pleased to receive your minutes."

Roy L. Morrison, 3745 Grimm Ave., San Diego 4, Calif. " Just received the last number of the Minutes and the list of Pelecypoda. Too many thanks cannot go your way for this excellent work. Have had some splendid low tides lately. I collected three Cypraea spadicea at the entrance to Mission Bay near the bridge. The first I have ever collected there in fifteen years of collecting. Others have found them there but me never."

Dr. Paul Bartsch, Curator, Division of Mollusks and Cenozoic Invertebrates, Smithsonian Institution, United States National Museum. We have reason to be proud of the following note from Dr. Bartsch " Distributional List of the West American Marine Mollusks from San Diego, California to the Polar Sea. I have placed this in our library. It should prove very useful to the workers on the coast. Let the good work continue."

Clyde H. Hebert, Ch. Pharm. USN, U.S.S. Griggs (APA 110), c/o Fleet Post Office, New York, N.Y. " A friend has sent me a couple of duplicate copies of the minutes of the Southern California Conchological Club. I found them very interesting and instructive, and would like very much to be placed on your mailing list to receive them regularly. Am enclosing a money order of one dollar to help defray cost of postage. I was introduced to, and acquired an interest in conchology through Mr. L.M. Wright, USN, while stationed in Bermuda a couple of years ago. We made quite a collection there, as far as war time restrictions permitted. These minutes of your club's meetings will help me to keep my interest up while at sea and collecting difficult if not impossible.

Glenn R. Webb, Pvt., 395th Signal Co. Avn., A.P.O. 126, c/o Postmaster, New York, N.Y. " It was good to hear from you and to receive the club minutes, a much appreciated thrill in itself, since this was the first shell news I have received for some months. Dr. Gregg has already mentioned I gather the fun I have been having dissecting local land snails. Considerable interesting data on the local landsnails here is accumulating. Specimens were abundant and readily accessible up till about Christmas. Snow has blanketed the ground almost continuously since, so, except for those captive specimens I had put away, there is less to do. The notes on radula-tecnique of the November minutes were very interesting. If any of the radula enthusiasts are desirous of European landsnail material, I would be able to assist with the available species, although I might have to send dried material. It should be known, however, that possible movement from here would perhaps render this plan impossible although I do not anticipate such. Incidentally the notes on radula tecnique recalls to mind a permanent glycerine drop tecnique I have used. The dominent current trend, however, seems to favor balsom mounting m media. At the moment the December minutes have just reached me. Thanks a lot for your kindness in continuing to send them to me. "

W.J. Bower, 340 Third Street Soouth, St. Petersburg 5, Florida. " Until I received my copy of Johnsonia your memoranda in Minutes #30, p.6, as to some changes on labels did not mean much to me. There is one change made which does not seem correct to me- Conus pealii Green to Conus jaspideus Gmelin. I have been finding a lot of these cones this winter, so was specially interested in this change. It is stated in Johnsonia, and Dr. Clench also wrote me, that in 1830 Green was working froma juvenile specimen of C. jaspideus so that C. pealii is now just a synonym of C. jaspideus. The accepted name now for what has been C. pealii since 1830, is C. stearnsi Conrad. I am writing Dr. Vaughn, Director of the Nashville Children's Museum, mentioned in my last letter, that he make a contribution and ask to have your minutes sent to the Museum. The address is 724 Second Ave.,S., Nashville,Tenn. Three cartons of shells went to him today (111) species, mostly Florida shells, which my friend and I collected and begged from other members of our Shell Club. I'm now working on the small stuff which has to be displayed in vials, so a good many more species will follow soon. You see I'm not a shell collector, i.e. not building a collection- I'm a shell hunter. I have the fun of finding them, cleaning and studying them, and the further pleasure of giving them away. Recently I tried Tom's plan of getting out the radula (caustic soda) and it worked fine."

Dr. Jeanne S. Schwengel writes " My husband pur Dr. Pilsbry on the train for Florida a few days before Christmas, and he is not expected back until the 8th or 9th of March.Wish I could get out to California to meet you and the others of your most interested group."

The wreckage on Sanibel Island was unbelievable. Every local cottage went to sea. The cement steps of my cottage stood alone. My bathtub sits about a hundred yards away beside the road. And just the day before we left for N.Y. (Jan. 15)- my shell cases were found about 1½ miles back in the swamp, smashed beyond repair and my entire collection of Sanibel shells lost. Of course, I have duplicates here in N.Y. but it was still quite a loss. Dr. Perry's house (substantially built) was such a wreck she sold it (as is) for practically nothing. But I differ with Lillias Cockerill that the shells were all buried. One visitor picked up 31 Pecten raveneli (with animal) in less than one hour. I never saw such a gorgeous display. I sent five large boxes of beach gastropods to A.N.S.P. for the children that were much finer specimens than most people use for exchange. All gathered in a short time in front of the hotel.

A. Sorensen, 247 Granite St., Pacific Grove, Calif. Mr. Sorensen is planning another of his trips to Mexico during the months of March and April and will no doubt as usual bring back a cargo of rarities.

Carl W. Erickson, 4 Windsor Ave., Auburn, Mass. " First, I want to express my sincere appreciation for your letter and the minutes of the Conchological Club of Southern California. The material is both illuminating as to what a shell club can do and instructive in the field of shell collecting and identification. As you said in your letter, the Southern California shell club membership is made up of advanced students, and this is borne out by the minutes." We announced Mr. Erickson's classes in the study of shells in the last minutes. He further comments " I announced another class late last fall and it is meeting with considerable success in stimulating interest in shell collecting. It numbers a dozen regular students, if you want to call them that, with frequent visitors. Last week, Dr. Clench of Harvard paid a visit and spoke on " Wat and the Snails". " .. " The class meets every week and n0 fee is charged, Even the mimeographed and other material is given gratis. I understand that the New England Museum at Boston is instituting a like course next month with Dr. Clench as instructor. A $5 fee is to be charged for ten sessions." The last line is of interest. If Dr. Clench could give such a course in California I am sure that he would have a large class.

Mr. Allyn Smith, 722 Santa Barbara Road, Berkeley7, Calif. The following notes are excerpts from Allyn's recent letter.

" I understand that Mr. and Mrs. Harry Turver are leaving for Los Angeles soon, taking all or most of their collection with them. Harry has accepted an appointment as a minerologist for the Standard Oil Co. there. No doubt you will find them welcome additions to the Club as they are both enthusiastic shell collectors, interested in other forms of marine life as well. Harry was the originator and one of the mainstays in the operation and maintenance of the Marine Museum and Aquarium at Santa Cruz. Doubtless he will be missed. I expect John Strohbeen of Santa Cruz will have to carry on when the Turvers leave. John, by the way, is a shell collector in addition to being better known, perhaps, for his splendid butterfly collection. He also collects fossils, crabs, sponges, and fungi, in addition to being a top installer repairman for the Telephone Co. He dropped into my office the other day with an interesting story of his experiences in getting deep-water material from the fishermen. It seems that the fishermen who use set-lines for sable-fish (or black cod- Anoplopoma fimbria) in about 300 fathoms, 14 miles off Davenport, Santa Cruz Co., often bring up shells as wellas other interesting things on their hooks from this depth. The shells have growing on them a small species of sea anemone, one to a shell, and the hooks often snag the anemone and thus bring the shell to the surface. He has been able to get these shells saved for him and in the last year or so he has received the following list of species:

Cancellaria cooperi Gabb	About a dozen specimens
Antiplanes major Bartsch	Many. Apparently common.
Rectiplanes (species ?)	At least one, possibly more.
Neptunea tabulata Baird	About fifteen, all sizes

Neptunea amianta Dall	About ten, all sizes
Neptunea ithia Dall	About a dozen, at least one full-grown one is four or five inches long.
Calliostoma platinum Dall	Four specimens, including one beauty measuring roughly 39.0 mm high and 35.5 mm in diameter, which he had with him and showed me.

This is an interesting list of rare species. All shells are living specimens in good condition. Some fishermen can do a lot for us conchologists if the proper approach is taken. It seems that an occasional gallon of wine or sack of onions is most productive of rare shells from deep water, if the right people are involved,

New Publications

A Preliminary Survey of the Mollusca of Kingman County, Kansas, by Dorothea S. Franzen and A. Byron Leonard, Univ. Kansas, Trans. Kansas Acad. Sci. 45:334-343, pls. 1,2, 1 text fig. 1942

Additional Studies of the Sanborn Formation, Pleistocene, in Northwestern Kansas, by A. Byron Leonard and John C, Frye, Am. Jour. Sci.; 241: 453-462, 1 pl., 3 test figs., July,1943.

The Mollusca of Meade and Clark Counties, Kansas, by Alice E. Leonard. Trans. Kansas Acad. Sci. 46:226-240, 2 pls., 2 text fogs, 1943.

Reconnaissance of Pleistocene Deposits in North-Central Kansas, by Hibbard, Frye, and Leonard. Univ. Kansas Publ., State Geol. Surv. Kansas, Bull. 52, Pt.1, 28 pp, 2 pls., 2 text figs, Feb. 20,1944. (Lists mollusks among invertebrate fossils).

Mollusca of the Laverne Formation (Lower Pliocene) of Beaver County, Oklahoma, by Leonard and Franzen. Univ. Kansas Sci. Bull. 30-1(2):15-19, pls. 1-5, May 15,1944. (A total of 24 species is discussed, 11 of them new).

Westward extension of the Kansas " Equus" Beds, by Frye,Leonard, and Hibbard. Jour. Geol. 51(1): 33-47, 3 text figs., Jan.-Feb., 1943. (Lists of fossil and fresh-water mollusks given in discussing faunules).

Mollusca of the Wakarusa River,Valley, by Franzen and Leonard. Univ. Kansas Sci. Bull. 29-2(9):363-439, pls. 28032, 6 text figs., This is an interesting paper, which gives the vernacular names of the fresh-water bivalves, some of which are as follows:

Truncilla donaciformis (Lea)	" Fawn's foot"
Lampsilis siliquoidea (Barnes)	" Fat mucket"
" anodontoides (Lea)	" Yellow sand-shell"
Carunculina patva (Barnes)	" Liliput shell"
Proptera alata (Say)	" Pink heel-splitter"
Leptodea fragilis (Raf.)	" Fragile paper-shell"
Tritogonia verrucosa (Raf.)	" Buckhorn"
Strophitus rugosus (Swainson)	" Squaw foot"
Anodonta grandis Say	" Floater"
Lasmigona complanata (Barnes)	" White heel-splitter"
Amblema costata (Raf.)	" Three-ridge"
Quadrula quadrula (Raf.)	" Maple leaf"
" pustulosa (Lea)	" Pimple back"
Fusconaria flava (Lea)	" Wabash pig-toe"

THE PTEROPODS

by Dr. Joshua L. Baily Jr.

Perhaps the most problematic group within the molluscan phylum is that of the Pteropods. Cuvier, who originated the term, considered them to constitute a separate class of equivalent rank to the gastropods, and for a long time this view was commonly held, but not so much on account of the taxonomic value of the parapodia as to the fact that the relationships and resemblances of this group are so involved that it was impossible to assign them to any subordinate position beyond the possibility of reasonable doubt that it was the correct one. A later writer whose name I do not now recall united them with the Cephalopoda on the ground that certain fossil pteropods have concamerated shells, and that certain recent species have a terminal sucker which may be homologous to that of *Spirula*. Blainville considered them to be derivatives of the Nudibranchs, and Cooke, in the Cambridge Natural History considered them to be modified Tectibranchs. Pelseneer followed the latter course, but with this difference. He divided the pteropods into three groups, one of which he excluded entirely from the mollusca, and to the other two he assigns different positions in the taxonomic scheme,because he believes them to be not closely related. Finally, Sit D'Arcy W. Thompson has pointed out certain structural resemblances between this group and the Brachiopods. He does not suggest a relationship with the brachiopods, but the similarities which he points out are somewhat surprising.

Now there are good reasons for whichever view we choose to take as to affinities of the pteropods, so that before the true taxonomic relationships of the pteropods can be worked out all the evidence for any view must be sifted and evaluated. Unfortunately this is easier said than done.

The present writer has never seen a living pteropod, not has he ever found a dead one. The only fossil pteropod that he has ever seen may turn out to be something else. His only knowledge of the group comes from the printed page, to which all readers of these notes have equal access. Therefore he does not feel competent to solve any problems, but he does feel competent to state what the problems are, and he feels that it is important that this be done.

The structure which gives the Pteropoda their name is the pair of parapodia, lateral extensions of the foot by means of which the animal is enabled to swim. But these parapodia are not peculiar to this group. They are well developed and very conspicuous in *Bulla gouldiana* and *Navanax inermis*, but in these two species they are not used for navigation but adhere closely to the back and sides of the animalin the position assumed by the lobes of the mantle of *Cypraea*, which they resemble. Some years ago the writer saw in a tank in the New York aquarium a pair of what we in California call "ink fish" but which in the east are called " sea pigeons", one of which undulated its parapodia, and by so doing swam upward to the surface, at an angle of about 45 degrees. He has never seen a California ink fish swim in this way and doubts whether it can do so. In the Treatise of Zoology already referred to there is a statement that other Tectibranchs can swim thus, and an illustration of a species of *Akera* doing it. Dr. A.W. Pillsbury, who specializes in moving pictures of unusual objects has exhibited an undersea picture of some pteropods of the genus *Cavolina* in motion, but in the interest of accuracy it must be said that the " wings" of this species do not undulate, but beat rigidly, like those of a butterfly, in which the entire wing moves in the same direction at the same time, whereas the undulations of the parapodia of the ink fish were a much more graceful motion, suggesting that of the folds of a flag flying in a breeze, which form at the flagpole and flow along the flag to the opposite margin.

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In addition to their parapodial navigation, the pteropods exhibit other characteristics which resemble those of the tectibranchs. They have a euthyneuric nervous system. It will be recalled that Pelseneer divided the Gastropoda into two subclasses, the Euthyneura and the Streptoneura, which are based on the structure of the nervous system. The main nerve cord of the euthyneura is ring-shaped, but in the streptoneura the posterior part of the ring has been rotated about a longitudinal axis, so that the nerve cord is twisted into the form of the figure 8. The euthyneuric form is the more primitive of the two, and occurs in the primitive amphineura, but the euthyneuric gastropods that are alive today are a highly specialized group, and many of them pass through a streptoneuric stage in their embryological development, which indicates that their euthyneurism is a secondary condition derived from a streptoneuric ancestry. Borradaile and Potts state that in the two orders of the euthyneura, which are the opisthobranchs and the pulmonates, the euthyneuric condition has been arrived at in two different ways. In the opisthobranchiata there has been a detorsion which has restored the nervous system as well as the other organs of the pallial complex to a position approximate to that of their ancestral condition, while in the pulmonata the euthyneuric form has been brought about by the atrophy of the posterior loop. Consequently Borradaile and Potts believe that these two orders have not had a common origin and their inclusion in a single subclass is somewhat arbitrary and unnatural. They prefer the arrangement of Cooke in the Cambridge Natural History.

We need not speculate as to relationship of the opisthobranchiata and the pulmonata here, but we should note that in the opisthobranchiata the most primitive genus, Acteon, is streptoneuric, and further resembles the streptoneura in having an operculum. It probably represents the " missing-link" between the Preosobranchiata which are streptoneuric and the opisthobranchs. In the same way, one of the most primitive genera (but not the most primitive) of the pulmonata, Chilina is also streptoneuric, and to that extent probably resembles the ancestral pulmonate, which would seem to afford confirmation to Borradaile and Pott's suspicion that the pulmonates and the opisthobranchs are not specially closely related.

Now the euthyneuric nervous system of the pteropods has already been referred to, but it is a curious fact that in this group also the most primitive family, the Spiratellidae, (formerly called the Limacinidae) is streptoneuric. This family also resembles the streptoneura in having a spirally coiled shell, the only instance of this among the pteropods. This resemblance of the pteropods to the streptoneura militates against the theory that the pteropods are modified tectibranchs, for it would compel us to believe that in its evolutionary development the Spiratellidae had twice developed a streptoneuric nervous system, which seems highly improbable.

So far as the present writer is aware, no one has ever suggested that the tectibranchs might have been derived from the pteropods. This seems equally as unlikely as the inverse arrangement, as it would seem just as improbable that the Acteonidae should have twice acquired a streptoneuric condition as that the Spiratellidae should have done so. But Tryon, in his Structural and Systematic Conchology, hints that the systematic position of the Acteonidae is not beyond all possibility of a reasonable doubt. It may not be impossible that tectibranchs are a diphyletic group and that those with parapodia are derived from a pteropod ancestry. It does not become one who has no first hand knowledge of this group to advance any such revolutionary theory: the present writer refers to the possibility only to show how complex are the relationships which must be solved before the final systematic position of the pteropods can be considered fixed.

When we come to study the paleontology of the pteropods we find that instead of throwing light on the matter their paleontology only makes matters more complicated. The tectibranchs originated in the Mesozoic, while the pteropods which are supposed to have been derived from them, are reported to occur in the early Cambrian. An excellent picture of one of those Cambrian pteropods appears in the Encyclopedia Brittanica, 14th edition, under the article on the gastropoda. The general consensus of modern opinion seems to be that these so called pteropods are not even mollusca, but may be worms. In this case the parapodial arms may be homologous to the arms of the brachiopoda, and the present writer imagines that he can discern a resemblance to the plastron of the burrowing crab *Hippa analoga* in which case the arms coule be interpreted as oral appendages.

Of course, if the paleozoic pteropods are not even mollusca they can throw no light at all, either pro or con, on any theory of derivation of the pteropods, but if their molluscan affinities should eventually be upheld many deep seated changes in molluscan taxonomy would be involved. The resemblances between the paleozoic and recent pteropods are not with the primitive recent forms such as the *Spiratellidae*, but with the highly specialized forms, such as *Clio* or *Creseis*. Of course, nobody knows whether the paleozoic pteropods were euthyneuric or streptoneuric, but the fact that they resemble only the euthyneuric forms among the recent pteropods makes it almost impossible to conceive of the *Spiratellidae* as being the transition between the paleozoic and recent pteropods. If the paleozoic forms are considered the ancestors of the recent forms, it will be then practically inevitable that the *Spiratellidae* and perhaps the *Cavoliniidae* as well should be removed altogether from the pteropods and assigned to a position closer to the streptoneura than to the euthyneura.

To sum up the difficulties that confront the systematist who tries to settle the position of the pteropods we may say that it is impossible to include in a single group all of the species that have ever been considered to be pteropods. But we can say with certainty just which forms should be eliminated. We can say this much, however. If the *Spiratellidae* be eliminated we are faced with the necessity of finding a position somewhere else for them, as they are undoubtedly mollusca, but if the paleozoic forms be eliminated we are faced with no such responsibility, for if they are not pteropods they are not mollusca. The headache can then be passed on to the helminthologists. At present this seems to be the more populat solution of the problem, but it may possibly be popular only because it is easier. And if we doadopt it, that is not the end of our troubles, for in any case the relationship between the pteropods and the parapodiate tectibranchs presents difficulties of its own. A great deal of further study is needed before the pteropods can be assigned to a definite position in the taxonomic scheme.

MINUTES OF THE MARCH MEETING OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIF.

The club met on March 4 at 2:30 P.M. in the Directors Room of the Los Angeles Museum. The meeting was called to order by the president, Mr. George Willett.

Mr. A. M. Strong reported for the Nomenclature Committee and discussed the new Nautilus calling attention to Acmaea cona Test, and the article by Katherine Palmer on the Carpenter types. Notice was also taken of Dr. Bartsch's paper on the Turris Mollusks.

The program was taken up which was the discussion of the Pteropoda, and the families Acteonidae,and Acteocinidae.

In the absence of the secretary, Mrs. Effie Clark, the predident appointed Mrs. Elsie Chace to act as secretary.

Elsie Chace, Sec. pro-tem.

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It isnt often that we receive two letters from two different Wrights inthe same mail but here they are and both of them in the U.S. Navy even though at the moment a long way apart.

Mrs. Charles R. Wright, 410 N. El Molino, Pasadena 4, Calif. " Please forgive me for neglecting to send you stamps to help defray your shell news costs. Charles asked in a recent letter whether he was still receiving the shell news. Theyare all waiting for him in the bottom desk drawer. Charles has been in New Guinea since Nov. He has sent home several large boxes of shells. I know he'll be anxious to talk over collecting with you again."

L.M. Wright, CEM, U.S. Navy, 418 Plaza Hotel, Miami, Florida." I am contributing a mite in the way of a box of shells (some fossil) collected along the ship channel entrance to Miami Harbor. This is slightly polluted water and real ' nice'shells shun it, but at times of storms some are driven in and die, other shells dont mind if the water isnt too filthy. No doubt you can identify them as none are rare or unusual. I do not have the time at present to write up labels as I am expecting a hurry call to my home 275 miles away. To some of the clubs members who have collected on Florida beaches I may say that many fine species are getting very scarce- Oliva, Polinices, Tellina radiata etc. whereas I believe Atrina is more common than ever. I counted eight Fasciolaria gigantea of average length of 7 inches which seems to be full size in this particular vicinity. I hope some of these will be of interest to our collaborating friends. Your Minutes #44 and accompanying Distributional List of Pelecypoda is splendid."

Mr. Wrights box will be at the next club meeting to be passed around to those interested as is customary at the meetings. We are always very grateful for such contributions.

Mrs. E.W. Boerstler, P.O. Box 494, Corona del Mar, Calif. Your editot wishes to tryand thank the Boerstlers for a fine pair of Cypraea spadicea from Newport Bay. Both of themare beautiful shells but as reported before the black one is the darkest I have ever seen of this species.

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Members with good exchange lists had better break them out and read the following. The editor has exchanged with a host of collectors in Australia including several from Sydney including Major H.S. Mort, Melbourne Ward and others so will simply run the following letter received from a new and welcome correspondent.

Mrs. Leonie Woollacott, c/o Charlie Messenger, Beach Rd., Edgecliffe, Sydney, NSW, Australia. " I have been fortunate enough to have had passed on to me a copy of the " Minutes of the Conchological Club of Southern California" of which you are editor. I have found the " Minutes" very interesting and as Chairman of the Marine Section of the Royal Zoological Society of New South Wales I think they would be of great value to me in my work. Would you kindly let me know if it would be possible to receive them regularly. I am myself a very enthusiastic collector and am very anxious to find some one in California who would be interested in exchanging shells for those of Australia. I was thinking of writing Miss Adele Koto in regard to this but thought that you would be the best person to consult. If you know of any one I would be very pleased and grateful if you would advise me. The shells I have for exchange are New South Wales specimens mostly. Theyare named according to Charles Hedley's check list of 1918. The locations are given in each case the reef, beach, or mud flat is named clearly. I think that if I were to find some one to exchange with me such an arrangement would prove very interesting and stimulating to both parties concerned."

P.C. Hutchinson, HA 2/c, U.S. Naval Hospital, Newport, Rhode Island. This is the latest address for Mr. Hutchinson who has until recently been stationed in San Diego, Calif.

Rev. Paul D. Ford, 160 W. 20th St., Erie, Pa. We were pleased to receive a small series of very nice specimens from Rev. Ford that were collected by his son, Ruel E. Ford in 1944 on Engibi Island, Eniwetok Atoll, Marshall Islands. The box contained the following species as determined by Dr. H.R. Hill of the Los Angeles Museum who is our authority on species from the central Pacific.

Bursa bufonia Gmelin, Clava pharos Hinds, Conus catus Hwass, Conus ceylonensis sponsalis Chemnitz, Conus flavidus Lamarck,Conus hebraeus Born, Conus milaris Hwass, Conus vermiculatus Lamarck,Conus vitulinus Hwass, Cypraea annulus Linnaeus, Cypraea reticulata Martyn,Cypraea ventriculus Lam., Drupa morus Lamarck,Drupa ochrostoma spectrum Reeve,Drupa ricinius Linnaeus, Drupa tuberculata Blainville,Mitra acuminata Swainson,Mitra cucumerina Lam., Mitra litterata Lamarck,Nassa glans Linnaeus, Nerita albicella Linnaeus, Strombus floridus Lamarck, Coralliophila sp.

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Announcement of New Publication

We have a letter from Dr. W.J. Clench, Museum of Comparative Zoology, at Harvard College, Cambridge 38, Massachusetts:"Dear John- Under separate cover I am sending you #1 of our new publication " Occasional Papers on Mollusks".

We plan this publication in addition to Johnsonia as an outlet for many studies on mollusks. We plan papers on new species, faunistic studies, bio-bibliographic sketches, catalogues of families etc. We hope to put out 100 pages per year. Subscription price is $2.50 per 100 pages. .. We are going to do our best to put out good work, maintain a high standard and try to make the papers interesting and informative.

Keep up the grand work you are doing on your own reports. They are swell and exceedingly interesting."

Anything coming from Dr. Clench and the Museum of Comparative Zoology is certain to be classed under the title ' indispensible publications'. Therefore the logical thing to do is to immediately send in your subscription to Dr. Clench for " Occasional Papers on Mollusks." You will, of course, hear a great deal more about it shortly.

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It is exasperating to many of us to find so many of the most important publications on mollusks ' out of print'. Members having duplicate books or papers either for sale or exchange are urged to write us the list, and we will gladly give the matter notice in this paper. For that matter we will be happy to give any dealer in used books such free advertising as we can thinking to accomodate our members as well as the seller.

MINUTES OF THE LONG BEACH SHELL CLUB- March Meeting

The March meeting of the Long Beach Shell Club was called to order by the president, Mr. Baker, who reported on Mr. Burch's compilation of the reports of the Conchological Club of Southern California which are found in their minutes. He then read his report on methods used in collecting limpets, and we were encouraged to bring in our own experiences in shell collecting to add to this.

The speaker of the day, Mrs. Jean Wilkins, was then introduced by Mr. Baker. Her topic " Shell Collections" was illustrated by specimens from the Tremper,Hand, Lowe,and Zech collections which are in the Municipal Auditorium. Shells, she told us, are valuable for many different reasons, rarity, of course, raising a shell's value greatly. She showed a beautiful orange cowry, whose value is often $25 and up. Other valuable rare specimens shown were *Arcularia coronata*,*Bulimulus bailyi*, *Columbella filmerae*,*Trigonia dubia*. Other shell groups may be of value to the student because they show all ages of shells, as well as color variations. Variation because of locale also makes shells desirable, and this was illustrated by shells from the north coast which varied greatly from some farther south. The Tremper collection also contained type shells, which are now in the San Diego Museum. It was of special interest to many to know that shells shown had been originally collected by Dr. Dall and Mr. Hemphill, whose names are connected with so many specimens. One especially interesting group revealed a transition stage of *Thais lamellosa*, from variety *hormica* to variety *sitkana*, and was listed as having been collected by Mr. George Willett in 1916. *Purpura nuttallii* reveals especially well the variations in size and coloring, and young shells are very beautiful and helpful in shell study.

The Hand collection, Mrs. Wilkins said, added about 1000 shell species with probably half the number new to the Long Beach collection, as Mr. Hand was interested in land and freshwater shells and strange to say there is no specimen of the colorful Cuban *Polymita picta*. Many in this collection are from the southern states. This collection is also rich in co-types and paratypes, with large numbers from the same areas. The question was brought up regarding the fact that type shells are kept in the National Museum, which is not helpful to western shell enthusiasts. Mrs. Wilkins told how Mr. Lowe gathering together all of the new shells he could, picked out the most characteristic and bundled them off to this shell museum. Large shell collections may also be valuable because they contain many shells which can no longer be found. This is true of some species of the Liguus of Florida, found in the Lowe,Hand,Tremper,and Zech collections. This shell was widely written up and natives in their desire to obtain specimens, completely destroyed the area. Many shells formerly found in the Tennessee Valley are now obsolete. And still another value of shells to their owners is their beauty alone which has often, as in the case of the Oldroyds, started folk in their search for shells, leading on into the study and classification work later. It is always a pleasure to have as enthusiastic a speaker as Mrs. Wilkins and we are looking forward to seeing her arrangement of shells from the Zech collection in the Public Library the first three weeks in April.

Ruth E. Eaton- Secretary.

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During the work on the Pelecypoda by the Conchological Club of Southern California a limited number of each report was laid aside. These have now been bound into book form, and while most of them have been ordered we still have a few left. We are asking those receiving the book to contribute the sum of $5 to our fund.

John Q. Burch

#46 Back Page

Additions and Corrections

Minutes #33- p 8 - Nucula quirica Dall 1916 -- N. bellottii Adams Pavlof Bay, Alaska in 13-15 fms. (Lewis).

Minutes #33- p 13- Cardita paucicostata Krause,1885- Pavlof Bay, Alaska in 13-15 fms. (Lewis).

Minutes #42- p 18- Petricola pholadiformis Lamarck,1818. Note by Mr. George Willett " I can not tell Newport Beach Pleistocene Petricola from Atlantic specimens of pholadiformis,but none of the fossils are entire." An interesting reference on this species should perhaps have been mentioned- " Petricola pholadiformis Lam. in Europe", Hans Schlesch,1932 in The Naturalist for July,1932, London.

Minutes #43- p 6 - Tellina declivis Sowerby,1868. San Felipe, L.C.; Guaymas, Sonora,Mex. in 20 fms.; Acapulco,Mex. in 20 fms.; Panama; (Lowe).

Minutes #43, p 6- Tellina salmonea Carpenter,1864. Vancouver, B.C.; San Francisco,Calif.; Alaska; Gulf of Calif. (Lowe).

Minutes # 43, p. 6 - Tellina meropsis Dall,1900. San Diego, Calif.; San Felipe, L.C. in 10 fms.; Acapulco,Mex.; Guaymas, Mex.; Punta Penasco; San Ignacio Lagoon; Mazatlan. (Lowe).

Minutes # 43 p 7- Tellina carpenteri Dall,1900. San Diego (Hemphill); San Diego Bay; La Playa (Bristol); Catalina Id. in 50 fms. (Lowe); Santa Maria Bay, L.C. in 15 fms. ; San Pedro, Calif. in 35 fms. (Lowe).

Minutes #43- p 7- Tellina tabogensis Salisbury,1934-- T. panamensis Dall- San Felipe, L.C. in 10 fms.; Taboga Id., Panama in 5 fms.; Acapulco, Mexico (Lowe).

Min. # 43, p 8 Tellina buttoni Dall,1900. Morro Bay; Mugu Bay; San Pedro in 10 fms. (Lowe).

Min. #43- p 8 Tellina bodegensis Hinds,1844. San Diego (Dr. F. Baker); Ocean Beach (Bristol); Monterey Bay (Hemphill); Morro Bay; Santa Cruz(Lowe).

Min.# 43- p 8- Tellina santarosae Dall,1900. Terminal Island (Lowe).

Min.# 43 p 9- Tellina lutea Wood,1828. Kodiak and Shelikof Strait,Alaska.(Low

Min.343 p 9-10 Apolymetis biangulata (Carpenter),1856. An important extension of range os this species is involved in a record of H.N. Lowe from Magdalena Bay, Lower Calif. We listed the range to Todos Santos Bay.

Min. # 43- p 10- Macoma incongrua (Martens),1865. Hooniah Gracier Bay and Windfall Harbor, Admiralty Ids., Alaska (Kate Stephens); Port Graham, Alaska (Dr. F. Baker); Awaji, Japan (Baker).

Min.#43 p 10-11, Macoma brota Dall,1916. Friday Harbor,Wash; Wrangell,Alaska

Min. #43- p 12 Macoma irus (Hanley). (M. inquinata Deshayes). Thomas Bay, Alaska; Admiralty Ids.; Chicagog Id.; Baranof Id.; Glacier Bay (Stephens

Min. # 43 p 13- Macoma inconspicua (Brod. & Sby.),1829. One specimen from San Diego, Calif. (Dr. F. Baker) (now in San Diego Museum of Natural History); San Francisco Bay (Hemphill).

Min. #43 p 14 Macoma carlottensis (Whiteaves), 1880. Port Harvey, B.C.; San Island, B.C.; Port Orchard, Puget Sound; 2 specimens from San Diego in 20 fms. (Kelsey).

Min. # 43 p 15 Macoma yoldiformis Carpenter,1864. San Diego Bay (Dr. F. Baker San Pedro, Calif. in 10 fms. (Lowe).

Min. # 43 p 15 Macoma indentata Carp.,1864. San Diego,Long Beach,Hueneme, Calif.; Pta. Penasco,Sonora; Angeles Bay, Gulf of Calif. (Lowe).

Min. # 43 p 16 Macoma indentata tenuirostris Dall,1900. An extension of our recorded range is involved in the record of H.N. Lowe from Ensenada, Mexico.

Min. # 43 p 17 Semele striosa C.B. Adams,1852. Acapulco,Mex. (Lowe).

Min. # 43 p 17 Semele rubropicta Dall,1871. Agate Pass, Puget Sound,1920 (Eyerdam); Imperial Beach,San Diego Co., Calif., La Jolla.

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA
April 1945

The minutes and other publications of the Conchological Club of Southern California are not open to subscription. However, any of our friends interested in receiving them, may send us donations or stamps to help defray the cost of material and postage.

Any institution or library interested in filing these minutes is welcome to all available back issues and a place on our mailing list without charge. Students of particular problems are always welcome to ask us for specimens for study as well as all information we may have.

The next meeting will be held May 6, at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. at 2:30 P.M.
We are now meeting the first sunday of each month.

It is our intention to print a final report on our work when we have covered every group. In the meantime we are eager to get all information possible. Members and friends are urged to write in their experiences and opinions, and what is even more important advise us when they think we are in error.

Please mail all news about shells, shell publications, shell collectors, shell trips,localities etc. to your editor,

John Q. Burch,
4206 Halldale Ave.,
Los Angeles 37, Calif.

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The Library of Congress, Acquisitions Department, Washington 25, D.C.
" Dear Mr. Burch: The Acting Librarian of Congress has requested me to acknowledge, with many thanks, the gift mentioned below which you have so generously made to the Library. The gift received: two copies of your publication:

" Distributional List of the West American Marine Mollusks from San Diego, California, to the Polar Sea, from the proceedings of the Conchological Club of Southern California.
Part I. Pelecypoda..."

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The largest part of our bound copies have been ordered, but we still have some of them on hand. Inasmuch as all of our members have the material in the Minutes we feel justified in asking that those wishing copies of the book donate a sum of $5.00 to our publication fund.

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Mrs. Kate Stephens, 3746 Park Blvd., San Diego, Calif. We wish to thank Mrs. Stephens for her generous contribution to our fund, and from a conchologist of her standing we have reason to feel flattered by the following note " Just a small remembrance with many thanks for the best papers on conchology that I have ever seen."

Dr. W.J. Clench, Museum of Comparative Zoology, Harvard College,Cambridge 38, Mass. " Dear John:... Murex is well along- and we hope to have it out in April".

In 1934 the Conchological Club of Southern California printed a paper by A.M. Strong which is now out of print and in great demand. We are here republishing the paper for the convenience of those unable to secure a copy of the original.

KEY TO THE PRINCIPAL GENERA OF MICROSCOPIC GASTROPODS OF THE WEST COAST OF NORTH AMERICA

Shell without a visible spire.
. Shell tubular, the apex closed by a plug.
.. Surface smooth .... Fartulum (18)
.. Surface sculptured with raised rings only.
... Rings strong, 40 or less in number .... Caecum (18)
... Rings fine, 75 or more in number .... Micranellum (18)
.. Surface sculptured with raised longitudinal lines only
Elephantulum (18)
.. Surface sculptured with both rings and longitudinal lines .... Elephantanellum (18).
. Shell cylindrical or ovate, spire infolded.
..Columella with 1 or 2 faint plications or none.
... Apex ending in a more or less distinct spire .... Volvulella (1)
... Apex rounded with a pit or indentation .... Cylichna (1)
.. Columella with several sharp plications .... Cypraeolina (1)
Shell with a visible spire.
. Aperture long and narrow.
..Spire flat or exposed in an umbilical pit.
... Columella thickened, frequently with a fold ..... Retusa (1)
... Columella thin, without a fold .... Diaphana (1)
.. Spire elevated, more or less pointed.
... Columella with 1 or 2 indistinct folds .... Acteocina (1)
... Columella with 3 or more distinct plications .... Marginella (1)
. Aperture oblong or rounded.
..Aperture with a distinct canal or distinct notch.
... Shell sinistral .... Triphora (3)
... Shell dextral.
.... Aperture with a sinus at or near the suture .... Manhilia,etc. (1)
.... Aperture without a sinus.
..... Shell slender, tapering.
...... Columella with a strong fold .... Eumeta (7)
...... Columella smooth.
.... Spiral sculpture of smooth cords .... Seila (1)
.... Spiral sculpture strongly nodulose.
.... Aperture deeply notched but without canal...... Metaxia (1)
.... Aperture with a short, nearly straight canal... Cerithiopsis (9)
..... Shell ovate, covered with a heavy epidermis ..... Trichotropis (1)
.. Anterior end of aperture produced, more or less notched.
... Operculum multispiral, with a central nucleus .... Tachyrhynchus (1)
... Operculum paucispiral, with a lateral nucleus.
.... Inner lip partly detached from the body whorl .... Diastoma (8)
.... Inner lip appressed to the body whorl.
..... Aperture decidedly produced anteriorly .... Bittium (10)
..... Aperture slightly produced anteriorly .... Alabina (6)
.. Aperture entire, without anterior canal or notch.
... Nuclear whorls sinistral, set at an angle.
....Columella with 3 plications .... Pyramidella (4)
.... Columella with 1 plication .... Odostomia (4)
.... Columella without visible plications .... Turbonilla (4)

... Nuclear whorls dextral.
....Nuclear whorls slender, always cast off in the adult.. Truncatella (1)
.... Nuclear whorls retained in the adult shell.
..... Shell elongate, slender.
...... Surface smooth and highly polished.
.... Shell umbilicated .... Niso (15)
.... Shell not umbilicated.
.... Inner lip free, not appressed to the body whorl ... Haliella (15)
.... Inner lip appressed to the attenuated base.
.... Shell colored or with colored markings .... Strombiformis(15)
.... Shell uniformly white, straight or curved .... Melanella (15)
...... Surface with numerous, irregular, swollen varices ... Alaba (5)
...... Surface with regular axial ribs or sharp varices.
.... Aperture round with the inner lip continuous .... Epitonium
.... Aperture ovate, outer lip more or less thickened .... Rissoina (14)
..... Shell ovate or globose.
...... Aperture nearly filled with teeth .... Pedipes (1)
...... Aperture open.
.... Operculum calcareous, solid .... Tricolia (Phasianella)19
.... Operculum not calcareous.
.... Shell fairly thick and strong.
.... Surface smooth or finely striate.
.... Aperture separated from the columella by a shelf
.... Amphithalamus(11)
.... Columella narrow.
.... Nuclear whorls smooth .... Syncera (17)
.... Nuclear whorls thimble pitted.
.... Periphery sharply angulated .... Diala (1)
.... Periphery rounded .... Barleeia (17)
.... Surface sculptured.
.... Columella with a central swelling or tooth .... Iselica (1)
.... Columella smooth.
.... Shell umbilicate, aperture semilunate .... Fossarus (1)
.... Shell not umbilicate, aperture rounded .... Alvania (13)
.... Shell thin and delicate.
.... Aperture semilunate, umbilicus lacunate .... Lacuna (1)
.... Aperture broadly oval, umbilicus small or none.
.... Shell of many whorls .... Cingula (12)
.... Shell of few whorls ....Rissoella (17)
..... Shell turbinate or depressed.
...... Operculum calcareous,solid ..... Homalopoma (Leptothyra) (1)
...... Operculum not calcareous.
.... Interior of aperture brilliantly nacreous ..... Margarites)1)
.... Interior of aperture dull or slightly nacreous.
.... Aperture nearly circular, lip thickened.
.... Shell white or maculated .... Liotia (20)
.... Shell uniformly brown ....Heliacus (1)
.... Aperture rounded, lip thin, shell white, vitreous.
.... Umbilicus covered by a callus pad .... Teinostoma (1)
.... Umbilicus open.
.... Outer lip sinated in the middle .... Scissilabra (2)
.... Outer lip not sinated.
.... Spiral sculpture absent .... Vitrinella (2)
.... Spiral sculpture present.
.... Many equal spiral threads or incised lines .. Delphinoides (2)

.... One to six spiral keels.
.... Axial sculpture absent .... Circulus (2)
.... Axial sculpture present ....Cyclostrema (2)

List of Publications

1. Descriptions scattered through many publications.
2. Vitrinellidae. Proc. U.S. Nat. Mus. vol.32, No. 1520; vol.39 , No.1785 (These do not give the numerous species described by Carpenter and Adams).
3. Triphora. Proc. U.S. Nat. Mus., vol. 33, No. 1569; Proc. Cal. Ac. Sci. 4th Ser. Vol.15, No.6.
4. Pyramidellid Mollusks. U.S. Nat. Mus. Bulletin 68; Proc. vol.42, No.1903; vol.52, No. 2193; vol.70, No. 2660; Proc. Cal. Ac. Sci. 4th Ser.,vol. 17, No.7.
5. Alaba. Proc. U.S. Nat. Mus., vol. 39, No. 1781.
6. Alabina. Proc. U.S. Nat. Mus. vol. 39, No. 1790.
7. Eumeta. Proc. U.S. Natl. Mus., vol. 39, No. 1799.
8. Diastoma. Proc. U.S. Nat. Mus., vol. 39, No. 1802.
9. Cerithiopsis. Proc. U.S. Nat. Mus. vol. 40, No. 1823.
10. Bittium. Proc. U.S. Nat. Mus., vol.40, 1826.
11. Amphithalamus. Proc. U.S. Nat. Mus. vol.41, No. 1854.
12. Cingula. Proc. U.S. Nat. Mus. vol.41, Nos. 1858 and 1871.
13. Alvania. Proc. U.S. Nat. Mus. vol.41, No. 1863; Proc. Cal. Ac. Sci.,4th Ser., vol.19, No.4.
14. Rissoina. Proc. U.S. Nat. Mus., vol.49, No. 2094; Proc. Cal. Ac. Sci., 4th Ser., vol.19, No.4.
15. Melanellid Mollusks. Proc. U.S. Nat. Mus. vol.53, No. 2207.
16. Epitonium. Proc. U.S. Nat. Mus., vol. 53, No. 2217; Proc. Cal. Ac. Sc. 4th Ser., vol.19, No.5. (These do not contain a complete list).
17. Rissoellidae., Synceratidae and Barleeia. Proc. U.S. Nat. Mus., vol.58, No. 2331.
18. Caecidae. Jour. Wash. Ac. Sci., vol.10, No.20 (This does not contain the numerous species described by Carpenter and Adams).
19. Phasianella. Proc. Cal. Ac. Sci., 4th Ser., vol.17, No. 6.
20. Liotidae. Trans. San Diego Soc. Nat. Hist., vol.7, No. 37.

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Class GASTROPODA

Order PTEROPODA

" Pelagic animals in which the mid-region of the foot in its primitive condition, is relatively largely developed, and drawn out into a pair of wing-like muscular lobes, which are used as paddles."

" The Pteropods inhabit the high seas, floating constantly in the water by means of the lateral fins. They are extremely vivacious in their movements, and are frequently together in prodigious numbers" Sutter

Minutes # 46, pp 24,25,26 gave a clear discussion of the problems involved in this group. We have nothing to add to the article by Dr. Joshua L. Baily Jr. and will proceed with our distributional data. It is obvious that there is no subject more in need of the attention of a specialist. The literature is both scattered and confusing. Perhaps the fact that the experience of the Burches has been the same as that of other members will be self explanatory. In the course of our dredging and trawling operations covering a period of years we collected great numbers of Pteropods. The material was carefully preserved in alcohol, but we have never found a student interested in trying to classify our material. It is safe to state that there is no other order of mollusks characterized by such a general lack of information.

Suborder Thecosomata Blainville

Pteropoda provided with a delicate hyaline shell developed on the surface of the visceral hump.

Family SPIRATELLIDAE

Genus Spiratella Blainville,1817. Type. Spiratella antarctica Forbes. (Limacinidae- Limacina Cuvier,1817).

" Shell subglobose, sinistrally spiral, umbilicated; whorls transversely striated; umbilicus margined." (Tryon S. & S. Conchology- p 94-Limacina)

This is the only family in the order Pteropoda in which the visceral hump and consequently the shell is spirally twisted, and as pointed out by Dr. Baily the systematic position is problematical.

Spiratella pacifica(Dall)1871. " Point Barrow, Arctic Ocean south (Dall) to Redondo Beach, California (Burch.) Type locality,Monterey, Calif.

Collecting data: Off Redondo Beach, Calif. while dredging 5 miles off shore in 75 fms. (Burch); Forrester Island, Alaska- swimming near surface, caught in net (G. Willett); Monterey, Calif., dead on the beach 1866 (Dall) (A. Smith); San Francisco; Catalina Island, 30 fms.; Lat.40-11 N, Long. 125 - 9 W; (Lowe).

In Bulletin 112 Dr. Dall listed Spiratella sp. under subgenus Heterofusus Fleming,1823. We have no additional information on this species. It was stated by Dr. Dall " Off Oregon coast, in stomach of salmon".

Family CAVOLINIIDAE

Genus Cavolina Abilgaard,1791. Type (by monotypy), Cavolina natans -- Monoculus telemus Linnaeus.

" Shell external, calcareous, inoperculated, bilaterally symmetrical, not rolled up in a spiral, but at its apex often dorsally recurved. ..The shell has a variable form, which may always be referred to a hollow cone, more or less modified, flattened dorso-ventrally or circular in section. The apex is quite straight, recurved, or truncated; the mouth broad or narrow; with longitudinal or transverse ribs,etc. " (Suter).

Cavolina tricuspida (Rivers),1904. Described as Hyalaea tricuspida from the Pleistocene of Santa Monica Range, Calif. in Bulletin of the Southern California Academy of Sciences, Vol.3, No.5, May, 1904, p.69.

" Shell opaque white; dorsal plate widely convex; smooth on the disc; a lateral spine on either side and a terminal appendage short and truncate behind; parallel to the lateral spines is a carina; on the disc of the other side are five longitudinally situated carinae; aperture sharply truncate on dorsum, but strongly rounded on the opposite plate; the slit reaching quite to the lateral spines" J.J. Rivers.

The consensus of opinion at this time places Cavolina occidentalis Dall, 1908 in the synonymy. Grant and Gale consider it a subspecies of telemus thus making it C. telemus tricuspida (Rivers). The older editions of Keep " West Coast Shells", 1904 Ed. and also 1911 Ed. gave the species the Atlantic name tridentata. Dr. A. Myra Keen advises " Cavolina tridentata Forskal is an Atlantic species, and the name does not apply to our West Coast form as Keep supposed." Mr. Allyn G. Smith comments " C. tricuspida - Prefer to use this rather than telemus until we know more of the relationships between the two and think occidentalis is a synonym. Shells occasionally found on shore at Monterey after winter storms."

Collecting data: Caught in dredge net off Catalina Island (Burch); off San Diego (Dr. Fred Baker);

Cavolina laevigata (" Orbigny" in Deshayes),1836. Lamarck, Hist. nat. Anim. sans Vert., ed.2, vol.7, Jan. 1836, p. 423. Dr. A. Myra Keen states (Per. Comm. Feb. 1945) " This was described as Hyalaea, a synonym of Cavolina. Although Deshayes credits D'Orbigny with the name, there is no evidence he is author of the description, and probably it should be credited to Deshayes direct. We do not have a copy of D'Orbigny's " Voyage dans l'Amerique méridionale", so that I cannot check on the fact of whether he employs a name for the figure. As Sherborn in the Index Animalium credits Deshayes with the publication of the name, it may be the text of D'Orbigny's work was not yet in print or carried no valid names. I believe the California Acasemy has this work and perhaps Dr. Hertlein can check on this point for you. Apparently the species is American,and it may indeed be the thing Willett and Lowe identified." The original description follows:

H. testa subrotunda, depressa, tenui, nitida, hyalina postice uncinata, utroque latere brevi auriculata. D'Orb. Voy. dans l'Amer. me'rid. pl.7, f.15 à 19. Habite... Petite coquille tres remarquable par sa forme singulière; elle est arrondie, très déprimée, mince, transparente et polie; son coté supérieur est un peu plus convexe que l'inférieur; les deux cotés sont égaux, et ils sont prolongés posterieurement en une queue étroite, triangulaire, pointue et fortement recourbée en hamecon; l'ouverture est en fente tres étroite, bordée de brun violatre; elle occupe tout le pourtour de la conquille, si ce nest à l'extrémité postérieure,ou les deux parties sont réunies; vu de face, le corps de la coquille ressemble assez bien à un petit peigne; car ses parties laterales sont prolongées en deux petites oreillettes comprimées, formant les commissures de l' ouverture".

Collecting data: Catalina Island, California in 30 fms. (G. Willett).

Genus Clio Linnaeus,1767. Type. Clio pyramidata Linnaeus.

" Shell pyramidal, three-sided, striated transversely; ventral side flat, dorsal keeled; aperture simple, triangular, with the angles produced; apex acute" Tryon S.S. Conch. p 90- as Cleodora Peron & Lesueur,1810.

Clio exacuta Gould,1852. North Pacific Ocean, west of Columbia River (Dall) to Catalina Island, Calif. (G. Willett). Type locality, lat. 44 N.,long. 154 W, that is about 30 degrees west of the mouth of the Columbia River. (fide Oldroyd p. 20)

Collecting data: Catalina Island, Calif. 200 fms. (G. Willett);

Clio occidentalis (Dall),1871. Northeast Pacific between lat. 30 and 50 N. off the Farallon Islands (Dall). Type locality, North Pacific, off coast of California in lat. 33 N., long. 130 W. (fide Oldroyd p.20).

Collecting data: Dead shells dredged in about 100 fms. off La Jolla, Calif. (A. Smith); Santa Maria Bay, Lower Calif. (Lowe). Note: This record of Lowe's is an extension of range southward, to approx. lat. 25.

Genus Styliola Lesueur,1826. Type Styliola subulata Quoy (fide Tryon S.S. Conch. p.91)

" Shell slender, conical, pointed, straight or curved. Fins rather narrow, truncate,with small tentacles projecting from their dorsal edges, and rudiments of the mesopodium on their surface; mantle-margin with a spiral process on the left side. M. Rang states that he has seen these Pteropods clustering round floating seaweed." (Tryon S. and S. Conch. p. 91.

Styliola falcata Gould,1852. Northeast Pacific west of Oregon (Dall) south to Catalina Island, Calif. (G. Willett).

Collecting data: Catalina Island, Calif. in 30 fms. (G. Willett).

Genus Creseis Rang,1828. This genus seems to have been placed in the synonymy of Styliola by Tryon and the majority of authors. Dr. Dall in Bulletin 112 listed the following species:

Creseis subula Quoy and Gaimard,1827. Dr. Dall gave the range as simply " Warmer waters of the north Pacific". The genus is omitted by Oldroyd , Keen and others of recent date. Dr. A. Myra Keen states (Per. Comm. Feb. 1945) " I omitted Creseis subula Quoy and Gaimard because the range was so indefinite. Theile places this species in Styliola and says there is only the one species in warm seas."

Family Cymbuliidae

Genus Corolla Dall,1871. Type. Corolla spectabilis Dall,1871.

" Like Tiedmannia, but with the body pendant below, unattached to the pinnae, ovoid, constricted above; oesophagus produced, oral aperture trumpet shaped, produced into two points. Pinnae forming a single disk with retic--ulated muscular bands, separated by a deep sinus from the oral portion. Shell entirely absent. " (Dall).

Corolla spectabilis Dall,1871. Lat. 34 (San Pedro) (fide Keen 1937) to Monterey and Lat. 43 N. and Japan Seas (Dall). Type locality, North Pacific

Corolla vitrea (Heath and Spaulding),1901. Described and figured in A.N.S. Phila., 53:509-511, with 1 text fig. A.G. Smith (Per. Comm.Feb.1945) states " According to Heath, a large number of individuals of this species were taken at or near the surface of Monterey Bay in 1900, and since that time great shoals were noted at the same locality on two different occasions. Described as Cymbuliopsis. Not listed by Dall and possibly overlooked by him for Bulletin 112."

We have been unable to get a copy of the original description of this species. When received we will run the description under Additions and Corrections. Not in Oldroyd. See pages 25 and 26 for figure & description.

Suborder GYMNOSOMATA

" In this division the mantle-skirt is aborted, and there is no shell in the adult animal." (Suter).

Family CLIONIDAE

Genus Clione Pallas,1774. Type Clione borealis Brug. (fide Oldroyd).

" Head indistinct; tentacles six, conical, three on each side. Tooth of lingual membrane broad, convex behind, slightly two-lobed and denticulated in front; lateral teeth 12-12, simple, arched, rather swollen at the base, the puter gradually diminishing in size." (Gould, Report on the Invertebrates of Massachusetts).

Clione limacina Phipps,1773. " N. Bering Sea south to the Pribilof Islands, rarely in the Aleutians. Circumboreal." (Dall).

Clione dalli Krause,1885. Archiv. f. Naturgeschichte, vol.51, p. 298, pl.18, fig.19a. Type loc.: Aleutians nordlich vom Akutan Pass.

This species was added from a letter of Dr. A. Myra Keen (Per. Comm. Feb. 1945)" Dall(1908, Smith. Misc. Coll. vol. 50, pt.4, p. 502) considers this to be an immature specimen of C. limacina Phipps. I mention the name here just to put it on record."

Clione elegantissima Dall,1871. South of the Aleutian Islands, in lat. 51 50, long. 161 26 West (Dall).

Family PNEUMODERMATIDAE

Genus Pneumoderma Cuvier in de Roissy in Sonnini,1805. Dr. Dall in Bulletin 112 gave as author of this genus, Peron and Lesueur,1810. Dr. A. Myra Keen (Per. Comm. Feb. 1945) states " According to Sherborn, the first use of Pneumoderma is by Cuvier in 1805, in Sonnini's Suites a Buffon. He had published the name in 1804 in the vernacular, without species. We do not have the 1805 reference, so that I cannot verify whether the genus was without species until the description of P. peronii by Lamarck in 1819." Type. P. peronii Lamarck (?).

Pneumoderma pacifica Dall,1871. San Pedro, Calif. to lat. 45.

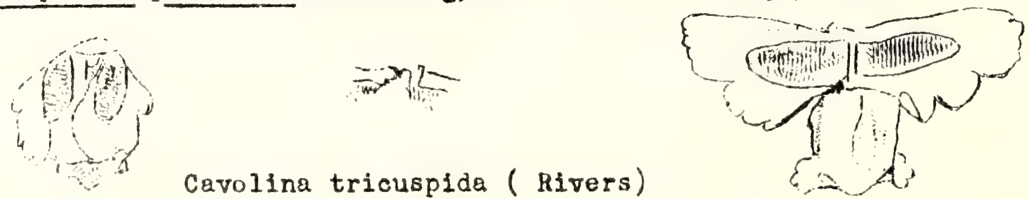
Dr. Dall in Bulletin 112 gave the southern limit of the range as " off the coast of California in lat. 37". However, Dr. A. Myra Keen in " Abridged Check List" gives lat.34, San Pedro, Calif. based on Dall's record in U.S. N.M. vol. 15, p. 194. Type locality. N. Pacific Ocean lat.37 8 N,long.136 10 West.

Collecting data: No specific records.

Family DESMOPTERIDAE

Genus Desmopterus Chun,1889. Type (by monotypy), D. papilio Chun. Dr. A. Myra Keen (Per. Comm. Feb. 1945) gives a free translation of the description of the genus given by Thiele " Without shell, body barrel-shaped, its forward part at an angle; foot small, float large, 5 lobed, with 2 long whips; tentacles small, knob-shaped; osphradium right and ventral."

Desmopterus pacificus Essenberg,1919. Off San Diego, Calif. lat. 32 53 N.



Cavolina tricuspida (Rivers)
Dall's figs.

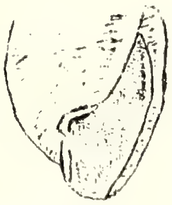
Order OPISTHOBRANCHIATA
Suborder TECTIBRANCHIATA

Family ACTEONIDAE

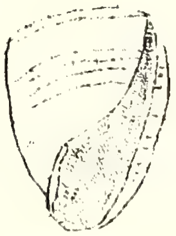
This family included the operculate, opisthobranchiate mollusca which possess a radula, differeing in the last feature from Acteocinidae.

Key to Genera

1. Columella with one fold	Acteon
2. Columella with no fold	Rictaxis
3. Columella with two folds	Microglyphis



Acteon



Rictaxis

Genus Acteon Montfort,1810. Type (by monotypy) Bulla tornatilis L. " Shell compact, with short spire and large, ovate body whorl; aperture over half the length of the shell, narrowed above, the columella bearing a single, simple, spiral fold." Pilsbry, in Tryaons Manual Conch.

Acteon traski Stearns,1898. Catalina Island to Panama. Type locality, San Diego, Calif.

This species is readily distinguished from the other described Pacific Coast species by generic characters. It is about the size of a large specimen of A. punctocaelata (about 15 mm in length) but has five post-nuclear whorls (including body whorl instead of four."

Collecting data: H.N. Lowe reported the species from Catalina Island in Nautilus, v.18, p. 19. ; dredged in 40 fms. off Ship Rock, Catalina Island (A.M. Strong); Magdalena Bay, Lower Calif. (Willett);

Subgenus Rictaxis Dall, 1871. Type (by monotypy), Tornatella punctocaelata Carpenter.

" Like Acteon s.s. , but with the columella projecting anteriorly or truncate obliquely."

Acteon punctocaelata (Carpenter), 1864. British Columbia to Magdalena Bay, Mexico. to S.E. Alaska (G. Willett). Type locality not given. Oldroyd suggests Santa Cruz, Calif. ? Dr. A. Myra Keen calls attention to the fact that the species was spelled punctocaelata in the original and not as often spelled punctocoelata.

This species is distinguishable from A. traski by the projecting columella , more ventricose body whorl, less effuse anterior lip and smaller size. Specimens that are generally classified as A. punctocaelata from southern California are very much larger than Carpenter's measurements indicate. Specimens in the Oldroyd collection at Stanford are relatively enormous, the largest being about 20 mm. in length.

The largest specimens collected by the Burches came from Monterey Bay in 25 fathoms and measure 15 mm. in length.

Robert E.C. Stearns in Proc. U.S.N.M., vol. 21, p. 299 described a variety as follows: " The Spanish Bight examples of A. punctocaelatus are without the least trace of the broad dark bands that characterize recent or living specimens. They are also much slenderer, and, on the whole, upon a comparison between numerous examples of both, more attenuated and delicate, though the columellar characters are the same. This fossil varietal aspect may for convenience be known as var. coronadoensis " (Reg. Nos. 148265-70, U.S.N.M.). Grant and Gale discuss this variety on p. 443 and place it in the synonymy of the typical along with the variety vancouverensis described by Mrs. Oldroyd. Mr. George Willett reports that he has dredged both the variety vancouverensis and the typical form from southeastern Alaska and the Burches have dredged both forms off Catalina Island and Redondo Beach, Calif. We are disposed to follow Grant and Gale.

Collecting data: Ketchikan and Craig, Alaska (G. Willett); 3-25 fms. in sand, in Monterey Bay, common (A.G. Smith); dredged in shallow water and taken littoral in many localities from Monterey, Calif. to Todos Santos Bay, Lower Calif. (Burch).

Acteon painei Dall,1864, Catalina Island, Calif. to San Diego, Calif.

Type locality, near Avalon, Catalina Island in 50 fms.

The shape of this shell is indicated by the fact that it has been suggested on first sight of specimens that perhaps they are the bulla stage of such a form as Trivia ritteri. However, a careful examination under a glass shows the distinctive sculpture. It is a very rare species and in few collections.

Collecting data: Mr. A.M. Strong has one specimen dredged in 30-40 fathoms off White's Landing, Catalina Island. There is one specimen in the San Diego Museum of Natural History.

There is but one other described species of Acteon from this coast which is A. panamensis Dall,1908 from Panama, and possibly A. venustus(d'Orb from Peru.

Genus Microglyphis Dall,1902. Type. Acteon curtulus Dall.

" This is a group of chiefly deep-water species, characterized by a very short spire and globose shell in which the end of the pillar is not only truncate as in Rictaxis , but has a marked sulcus behind it and is produced laterally into a rather wide spiral flange at maturity, and is concave with a single feeble plait behind the terminal laminae. Inoperculate."(Dall).

Microglyphis breviculus Dall,1902. Monterey, Calif. to Point San Quentin, Lower Calif. (Dall). Type locality, off Santa Rosa Island, United States Fish Commission Station 2902.

Collecting data: Dredged in 75 fms. off Redondo Beach, Calif. (Burch); off Catalina Island, Calif. in 200 fms. (G. Willett); 66-73 fms. off Point Pinos, in green mud and rocks (USFC Sta. 4552) rare (A.G. Smith.)

Microglyphis estuarinus Dall,1908. Straits of Juan de Fuca to Gulf of Calif. Type locality. U.S.S. " Albatross" Station 3194, off Estero Bay, Calif. in 92 fathoms. No collecting records.

Other described species of this genus are: M. mazatlanicus Dall,1908 from Mazatlan, Mexico in 995 fms. and M. parconicus Dall,1889 from the Galapagos Islands in 812 fms.

Family ACTEOCINIDAE

The following letter from Mr. A.M. Strong is an excellent introduction to the problems involved.

" The west coast species in this family can well be divided into three genera and two subgenera on shell characters alone. It may be that a study of the soft parts will make some changes necessary and a comparison with the types of the subgenera here used may also make some changes.

The species in the genus Acteocina s.s. are without sculpture, and the spire is elevated, conical, and with the nuclear whorls tilted. As the shell grows the older whorls lap up more and more on the preceeding whorls so that in the adult the apex appears more flattened than is the case with young shells. This is more noticeable in some species than in others. We can recognize three definite species as common in our fauna. A. eximia Baird is found in the Puget Sound area. A. culcitella Gould is found all along the coast on sandy bottom and in such places as sandy bars at the entrances to bays. A. inculta Gould is a very small species that lives on the mud flats in the bays. A. cerealis Gould is usually considered to be based on a young specimen of A. culcitella, and has been definitely stated to be such by Dall. A. planata Carpenter from San Diego is a senile specimen of A. inculta in which the spire has become flattened by erosion and the over-lapping of the body whorl. This has been noted by Bartsch. A. intermedia Willett, as the name suggests, is similar to both A. culcitella and A. eximia. If treated as a variety it would be hard to say with which it should be connected. A. smirna Dall is found off the coast of Lower California and has been reported as stray specimens from Laguna and San Diego. It does not really belong in our fauna. It is labeled A. recta d'Orbigny in the older collections but that species belongs elsewhere. A. infrequens C.B. Adams has been reported from Southern California but that is due to misidentifications. The species is not definitely known north of Corinto.

Prior to the dredging of Newport Bay there was a large sand bar just inside the entrance. On this a large number of a small Acteocina were collected which Dall identified as A. magdalensis Dall. We have seen no specimens from Magdalena Bay or a figure of the type by which comparisons could be made but the description seems to fit this shell. It could well be that this is the shell which Gould named cerealis and which Carpenter and others identified as A. infrequens C.B. Adams. This shell requires more study.

The subgenus Coleophysis contains two species in our fauna, harpa Dall from the north and carinata Carpenter from the south. The ranges over-lap in Southern California. In these the whorls of the spire are sculptured with fine axial lines which show on the body whorlfor a very short distance below the suture. Dall in Bulletin 112 lists the subgenus under Retusa and lists harpa under it. Carinata is listed under Acteocina. The subgenus is quite distinct and more like Acteocina than Retusa.

The genus Retusa s.s. has the whorls lapping over each other until the apex is slightly or not at all raised above the shoulder of the body whorl. Three circumboreal species are listed from the Arctic Ocean but probably do not belong to our fauna.

The subgenus Sulcularia has the overlapping of the whorls carried to a still greater extreme until the spire is in a deep sunken pit in the apex and more or less obscured by the body whorl. Only one species is reported in our fauna, S. xystrum Dall, though there are several species from further south. All are sculptured with axial lines. It is probable that these should be treated as a good genus.

The genus Volvulella has an extension of the posterior end of the outer lip which entirely covers the spire and ends in a more or less distinct apical point. Four species are listed from Southern California and several from further south. The Southern California species are V. cylindrica Carpenter, V. cooperi Dall, V. californica Dall, and V. tenuissima Willett. They can be separated by the arrangement of the incised spiral sculpture and slight differences in size and shape."

A report on this family was prepared by Tom Burch for the meeting of the Conchological Club of September,1938. This paper was published by the club at that time and covered a discussion of the anatomy, radulae etc. as well as data on the species. Information from this paper will be freely used here without further reference.

A few of the publications referred to follow: Arnold, Ralph, Paleontology and Stratigraphy of the Marine Pliocene and Pleistocene of San Pedro, Stanford University, 1903; Carpenter, Catalogue of the Reigen Collections of Mazatlan Mollusca, 1855-57, British Museum; Dall, W.H., Proceedings of the U.S. National Museum, 24:499-566, 56:293-371; Dall, W.H., Nautilus, vol.35, p.96,1922 and vol. 39, p.25,1925;Dall, W.H., Bulletin U.S. Natl. Mus. No. 112,1921; Dall, W.H., Amer. Jour. Conch. 7:136; Grantand Gale, Pliocene and Pleistocene Mollusca of California, San Diego Society of Natural Hist. 1931; Keen. A. Myra, West North American Marine Mollusca, Stanford Univ., 1937; Keep and Baily, West Coast Shells, Stanford Univ., 1935; Oldroyd, Ida, Marine Shells of Puget Sound, Univ. of Wash., 1924; Oldroyd, Ida, Marine Shells of the West Coast of North America, Stanford University,1927; Oldroyd, T.S., Nautilus, vol.34,p.114,1921; Pilsbry, H.A. and Tryon, G.W. Manual of Conchology, vol.15; Sowerby, G.B. Jr.,1889; Strong, A.M., Nautilus vol.35, p.44,1921 and vol.35 p. 122,1922; Willett, G.W., Nautilus, vol.42, p.37, 1928; Willett, G., Trans. San Diego Soc. Nat. Hist., vol.8,1937; Willett, G., Bulletin Southern Calif. Acad. of Sciences, vol.43,pp.71-73, 1944; Woodring, Carnegie Inst. Publication # 385, 1928.

Genus Acteocina Gray,1847. Type (by original designation), Acteon wetherilli Lea, Miocene of New Jersey. fide Grant and Gale, 1931, p.446.
" Shell small or medium sized, cylindrical, spire low, suture chanelled nuclear whorls small,papillate, more or less submerged, coiled at an angle of about 90 degrees to axis of post-nuclear whorls; aperture long,narrow, dilated,and rounded at anterior end; columella bearing an oblique basal fold emerging from aperture and merging into basal lip; sculpture absent or consisting of faint spiral grooves." (Woodring, Carnegie Inst. Publ. No. 385, p. 119, 1928).

Grant and Gale, 1931 advanced the theory that the differences between Acteocina and Retusa are so small and variable as to not be of generic significance, and therefore used the genus Retusa with Acteocina as subgenus. However, this has not been generally accepted.

Acteocina culcitella (Gould), 1852. Kodiak Island, Alaska south to San Martin Island, Mexico(Strong) , reported from San Ignacio Lagoon by E.K. Jordan. Type locality, Santa Barbara, Calif. (fide Oldroyd, p. 28).

The consensus of opinion at this time places the species cerealis (Gould) in the synonymy as being based on a young specimen of this species.

This species is distinguished from the other species of the genus by its long pointed spire and heavy fold on the columella.

Collecting data: A comment from Mr. George Willett who has collected extensively in Alaska is of particular interest " I would question Alaskan records". Dredged off Monterey in 20 fms. shale bottom, Redondo Beach, Calif. in 25 fms., off Avalon, Catalina Island in 25 fms., off Santa Monica, Calif.

Todos Santos Bay off Punta Banda (Burch); Monterey Bay in 10-25 fms. (A. Smith); Drier Bay, Knight Island, Alaska ,1923, in 15 fms. mud (Eyerdam).

Acteocina eximia (Baird),1863. Kodiak Island, Alaska south to Monterey, Calif. (Dr. Bolin) (Keen). Type locality, Eqquimalt Harbor, Vancouver Island.

This species has often been used as a subspecies of culcitella and it may be. However, it is distinguished by the lack of the heavy fold on the columella and in its shorter spire, which is set in a circular depression just within the upper margin.

Collecting data: Forrester Island and Craig, Alaska (G. Willett); Izhut Bay, Afognak Island, Alaska in 10 fms. mud, 1922 (Eyerdam); Hinchin--brook Island, Pr. Wm. Sound, dredged (I. Norberg,1932); 20-158 fms. in Monterey Bay, in mud and fine sand, fairly common (A.Smith).

Acteocina intermedia Willett,1928. Nautilus. vol.42, pp. 37-38 .

This was described as a subspecies of culcitella. Inasmuch as this is not in Oldroyd the original description follows:

" Acteocina culcitella intermedia, new sub species. Description: Shell cylindrical,with short.spire, the latter, however, not excavated at the apex. Columellar fold wanting or only slightly indicated. Lip and aperture as in A. c. eximia. Type number 1015 collection of Los Angeles County Museum, dredged by G. Willett in 30 fathoms at Catalina Island, California, August 11,1928. Measurements of type in millimeters: Alt. 14, Diam. 5.7, Alt. of spire 1.65. Paratypes in collections of A.M. Strong and the writer.

Intermedia is easily separated from typical culcitella by much shorter spire and absence of heavy columellar fold; it differs from eximia in more pointed and unexcavated spire. All of the specimens of intermedia seen by the writer have been dredged in from twenty to forty fathoms off the south--ern California coast. A few specimens of apparent intergrades between i intermedia and eximia were dredged in twenty-five fathoms near Craig,Pr. of Wales Island, Alaska, while at Forrester Island,fifty miles to the southeast, only eximia was found."

Collecting data: The exact range of intermedia is therefore uncertain but our experience has been to dredge it from Monterey to Todos Santos Bay, Lower Calif. It was the predominant species of the genus in dredgings off Redondo Beach, Calif. (Burch); San Pedro, Calif. in 10-20 fms. and off Catalina Island in 30 fms. (G. Willett); 10-30 fms. in Monterey Bay, in mud common (A. Smith).

Acteocina smirna Dall,1919. San Diego, Calif. to San Salvador
Type locality, San Diego, Calif.

This species has been reported from Laguna Beach, Newport Bay, San Pedro etc. However, all of these records so far examined north of San Diego have proven to be based on errors in identification. The species smirna is des--cribed as having among other characters the dimentions of -length 4, diameter 2. Obviously an occasional pathologic specimen of other species might attain these proportions. We have numerous sets in our collection that have been labelled smirna for the above reasons, but the only set on which we have this label today is a large series from San Martin Island from the collection of the late Dr. Fred Baker. In any event if the Baker shells are true smirna these others are not.

Collecting data: San Martin Island (Dr. Fred Baker); Point Loma, San Diego (Miss Edna N. Wilson)

Acteocina inculta(Gould),1856. Monterey, Calif. to Gulf of California. Type locality, San Diego, Calif. (fide Oldroyd, p.28)

This species differs from A. carinata (Carpenter) in not being as wide and flat on top and in being " pinched in" at the top of the body whorl. Mr. George Willett thinks that A. carinata may merely be a southern form of A. inculta.

Collecting data: Occasionally found on mud flats of southern California bays in considerable numbers. The shellsaverage about 4 mm. in length. They are found travelling just under the surface of the mud,and their presence is shown by a trail very similar to that of a small Olivella. Acteocina culcitella is occasionally found along with A. inculta. We have taken them this way at Mugu and Anaheim Bays. We have also dredged them in shallow water from Monterey to Todos Santos Bay. Found abundant in Morro Bay by Mrs. Rose Burch in May,1940 and in Alamitos Bay in Oct.,1940. The deepest record we have for the species is a bathymetric range off Redondo Beach from littoral to 25 fathoms. (Burch);

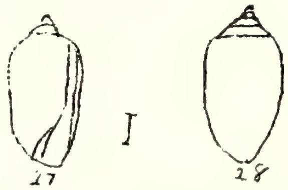
A note from A.G. Smith in regard to this species follows: " The Monterey record in Bull. 112 was based on a worn specimen of Retusa harpa , according to Gordon, and we have not collected it in the Bay. If your specimens are really inculta, we would like to add this to our list of valid species. " In reply to this comment will state that we have a few specimens that we identified as inculta although the predominant form in our dredgings off Monterey was A. intermedia Willett with Coleophysis harpa Dall not uncommon. (Burch).

Acteocina magdalenensis Dall,1919. Proc. U.S. Natl. Mus. 56:296. Newport Bay, Calif. to Magdalena Bay, Lower Calif. Type locality, Magdalena Bay.

This species was well figured by Mrs. Oldroyd vol.II, part 1, Pl.2, figs 2a,b. There has been a great deal of discussion regarding this species. The theory was advanced by Grant and Gale that it may be but the young of culcitella. However, it is our opinion that it is a good species and is distinguished by the oliva-like spire, more or less elevated and deeply channelled along the suture. It is smaller than adult culcitella and is a creamy color. We have compared it with numbers of young culcitella of the same size and found them easily separable.

Collecting data: The only specimens we have seen were from the entrance to Newport Bay collected by Mr. A.M. Strong and a set from Laguna Beach collected by Dr. W.O. Gregg. Mr. George Willett comments " Have this name on several lots of southern California specimens."

Dr. A. Myra Keen of Stanford University sent us a tracing of the orig--inal figures of Acteocina inculta (Gould) which are retraced below:-



Acteocina oldroydi Dall,1925. Departure Bay,British Columbia.

This species is known from the type locality only and none of our members have reported having a specimen.

Acteocina planata (Carpenter),1865. The consensus of opinion is that this species should be placed in the synonymy of A. inculta (Gould) on the theory that it is based entirely on senile specimens of inculta. It is described as having a flat top and being more slender than inculta. It was described from San Diego and presumably only found att the type locality. We have specimens from the lare Dr. Fred Baker taken from San Diego, but find that we can select the same form from our series of inculta from Redondo Beach and elsewhere. We are, therefore, abandoning the name planata.

Acteocina infrequens (C.B. Adams), 1852. Cape San Lucas to Panama. Type locality, Panama.

We list this species here because it was listed by Dr. Dall in Bulletin 112 with a range from Santa Monica south. There has been a great deal of misunderstanding of this species and unfortunately also a great many misidentifications. The species has never been figured to our knowledge.

Mr. A.M. Strong states that it is definitely not of the California fauna and is far more slender than any of our species. It is to be expected that Dr. Hertleinand Mr. A.M. Strong will give us a clearer idea of what this species is when their work on the southern fauna is published on this group.

We have record of but one other species of Acteocina from this coast and that is from the southern fauna. It is Acteocina angustior Baker and Hanna,1927 ranging from the Gulf of California to Acapulco, Mexico. It was described in Proc. Calif. Acad. Sci. Ser.4, vol.16, p. 124, pl.4mfig.5.

Genus Coleophysis Fischer,1883. Type (by monotypy), Utriculus truncul-us (Bruguiere). The original description from Manuel Conchyl., p.555: " Sommet tronqué , concave; coquille légèrement dilatée eh avant, rétrécie en arrière; pli columellaire plus ou moins distinct. Ex.: Utriculus truncul-us (Bruguiere), des mers d' Europe".

Coleophysis was used as a section of the genus Retusa by Dr. Dall, under which he placed the species harpa Dall, 1871. Dr. Dall placed the species carinata (Carpenter),1857 under Acteocina s.s. Inasmuch as both of these species in our fauna have the fine axial sculpture of Coleophysis, but not the spire of Retusa s.s., it seems logical to us to raise Coleophysis to generic standing.

Grant and Gale, 1931, pp.445-446 discuss Coleophysis as follows: " Retusa harpa (Dall) has the fine axial sculpture of Coleophysis Fischer but the type of the latter has an involute spire, the outer lip extending the entire length of the shell." Dr. A. Myra Keen (Per. Comm. March,1945) comments " The type of Coleophysis has a truncate if not a sunken spire."

Coleophysis carinata (Carpenter),1857. Redondo Beach, Calif. (Burch) to Panama (Zetek). Type locality,Mazatlan, Mexico.

This is a short blunt spired species, smaller than young Acteocina culcitella and is wider and flatter and more carinated on top than A. inculta. The suture is not channeled.

Collecting data: Dredged off Redondo Beach in 15-to 25 fms.

Coleophysis harpa (Dall),1871."Queen Charlotte Islands to San Diego" (Dall) but the present known range is Forrester Island, Alaska (G. Willett) to San Martin Island, Mexico (Dr. Fred Baker). Type locality,Monterey, Calif.

This species is easily distinguishable by the heavy longitudinal sculpture on the upper half of the body whorl.

Collecting data: It is interesting to note that specimens from the northern end of the range seem to average much larger and coarser. We have found it a not uncommon dredged species with a bathymetric range of from 15 fms. or less to as deep as 75 fms. off Redondo Beach. We dredged it off Monterey, Calif. in 15 to 25 fms., off Avalon, Catalina Island in 25 fms., to Todos Santos Bay, Lower Calif. (Burch); Forrester Island, Alaska to Los Coronados (G. Willett); 10-40 fms. in Monterey Bay, in fine sand and mud, common (A.G. Smith); Drier Bay, Knight Island, Alaska,1923 in mud at roots of eel grass (W.J. Eyerdam)- and the note Extended Range- to Prince William Sound, Alaska (W.J. Eyerdam); dredged off Friday Harbor, Puget Sound, Wash. (Trevor Kincaid).

Genus "Sulcularia" Dall,1921, U.S. Nat. Mus. Bulletin 112, pp. 61, 202, Feb.24,1921. Type (by original designation) (p.202) Retusa sulcata (d'Orbigny) as Bulla.

Dr. Dall proposed the name Sulcularia in Bull. 112 as a section of the genus Retusa. However, it is the consensus of opinion that the species involved are sufficiently distinct from Retusa s.s. or any other described genus to be placed in a separate genus.

Dr. Woodring raised the subgenus to generic rank and we agree with his solution other than the possible question of the name Sulcularia Dall. The difficulty here is well stated by Dr. Myra Keen (Per. Comm. March,1945) as follows: " Sulcularia Dall,1921 - Bull. 112, pp 61,202- is, as your cards reveal, a homonym of Sulcularia Rafinesque,1831, and is not available for use. Until someone gets around to proposing a substitute name or finding an available synonym, we had best use this name in heavy quotes, disinfecting it as much as possible." If there is any valid reason for ignoring Sulcularia Rafinesque,1831, it will no doubt be called to our attention. In the meantime it seems somewhat futile to clutter up our records with a name that is apparently already consigned to the synonymy. Therefore we propose to use the name Sulcoretusa to replace Sulcularia Dall. (Burch)

Grant and Gale,1931, p. 446 discuss this genus as follows: " Retusa xystrum (Dall), which ranges from San Pedro to San Diego, belongs to the section Sulcularia Dall. This section is very close to Coleophysis Fischer, but it has an apical perforation and no plication on the columella. The types of both Coleophysis and Sulcularia have fine axial sculpture, but the former has a very small fold or plication which is entirely absent on Sulcularia, Retusa xystrum (Dall), has fine axial striae. It is a very delicate, small shell, about 2 or 3 mm. in length."

Sulcoretusa xystrum (Dall),1919. San Pedro, Calif. to San Diego.
Type locality, San Diego.

Shell subcylindric with a deep pit at the apex; sculptured with extremely fine longitudinal grooves covering the whole surface.

Collecting data: San Pedro, Calif. in 10 fms., 1 specimen (Burch)

The following note from Mr. A.G. Smith is of interest in connection with the above species. " Retusa (new species) - Described and figured in our Monterey paper. Like xystrum, but has finer sculpture. It is a rare species."

There are several other species in this group in the southern fauna and the key to species from the notebook of Mr. A.M. Strong should be of great value to students working on this material. The key follows.

Sulcoretusa (Sulcularia Dall)

Spire involved, apex with a deep pit
. Shell widely constricted around the middle
.. Sculpture of fine axial grooves only
3 x 1 mm. Gulf of Calif. to Panama .... luticola C.B. Adams
.. Sculpture of fine axial and spiral striations
2.5 x 1 mm Gulf of California................. carpenteri Hanley
. Shell very little constricted around the middle
.. Sculpture of fine axial grooves only
... Outer lip evenly rounding into the base
3 x 1 mm. San Pedro to San Diego .... xystrum Dall
... Aperture very narrow behind the base
3 x 1.5 mm Galapagos .... galapagana Dall

Genus Retusa Brown,1827. Type, Bulla obtusa Montagu (-- ? plicata Brown -- ? discors Brown ,-- Voluta alba Kanmacher, fide Iredale,1915, and Woodring,1928); figured by Montagu, Test. Brit., pl.7, fig.3, 1803. fide Grant a nd Gale, 1931, p. 445.

" Columella without plications; inner lip incrusted with callus, which may be sharply deliminated; umbilicus closed or a mere chink."

Retusa semen Reeve,1856. Off Point Collinson, Arctic Ocean (Dall) to Prince William Sound, Alaska (Eyerdam). Type locality. Port Refufe,Nova Zembla.

Collecting data: Drier Bay, Knight Island, Alaska, 1923 in 10 fms. mud (W.J. Eyerdam).

Dr. Dall reports this species also from the Atlantic but it is not listed in Johnson or other faunal lists of Atlantic species in general use.

Retusa obtusa(Montagu)1803. Arctic Ocean to St. Mathew Island.Circumboreal. (Dall). Listed from Greenland by Johnson " Mollusca of Atlantic Coast"and a variety R. obtusa turrita Moller,1842 is also listed from Greenland. Type locality. England (fide Oldroyd p.32).

Collecting data: Inasmuch as this is the accepted type of the genus this species is of particular interest. Grant and Gale, 1931, p. 445 say of it " Bulla" obtusa, the type of Retusa, is a small, somewhat cylindrical shell without a columellar plication and with a spire which varied considereably in height and may even be truncated, the apex sometimes turned inwards. Jeffrey's description of the species is excellent."

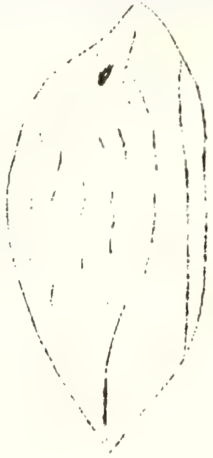
Retusa pertenuis (Mighels),1843. Arctic Ocean; Bering Sea (Krause). Also Atlantic. (Dall). Johnson gives the Atlantic range as follows: " Greenland to Fernandina,Fla.,10-294 fms.". Type locality. Casco, Maine. (fide Oldroyd) Mrs. Oldroyd also states that the type is lost.

Collecting data: Reported from Tromsofjord, Norway, collected in 1936 by I. Norberg (W.J. Eyerdam).

Genus Volvulella Newton,1891. Type (by subsequent designation, Bucquoy,Dautzenberg,and Dollfus,1886), Volvula rostrata A. Adams ; Australia. (fide Grant and Gale, p. 450).

" This genus is characterized in general by the thin, spindle-shaped shell, the concealed spire, and the posterior spine. The anterior end of the aperture is dilated, the columella bearing a faint fold." Grant and Gale.

The following note from Dr. A. Myra Keen is of interest about this genus (Per. Comm. March, 1945) " I notice that some Australasian writers are adopting Rhizorus Montfort,1810 instead of Volvulella Newton, but I do not think this is advisable. Below I give a tracing of R. adelaidis Montfort, the monotype. The species is said to come from the Adriatic, but Bucquoy,Dautzenberg, and Dollfus could not recognize it/ The description mentions green coloring with reddish zigzag lines and describes an umbilicus. It is undoubtedly a microscopic opisthobranch of some sort but not the thing we know as Volvulella."



Volvulella cylindrica (Carpenter),1863. Vancouver Island to Gulf of Calif. Type locality, Santa Barbara, Calif.

The entire surface of this species is covered with distant spiral striations. It is less cylindrical than V. cooperi and further differs in the more produced posterior spine.

Collecting data: Dredged off Monterey, Calif. in 40 fms., off Redondo Beach in 25 fms., off Avalon, Catalina Island in 25 fms., off Santa Monica in 15 fms., off Ensenada, Mexico in 20 fms. (Burch); San Pedro, Catalina Island, S. Coronado Island in 15 -30 fms. (G. Willett); off Monterey, Calif. in 15-63 fms., in sand and mud, scarse in the bay (A.G. Smith).

Volvulella cooperi Dall,1919. Point Sur, California to Scammon Lagoon, Lower Calif. (Dall,1921). Type locality, Scammons Lagoon, Lower Calif.

This species is without sculpture and is less distinctly spinose in the adult than any other West Coast species.

Collecting data: For a number of years the Burches identified specimens of the species V. tenuissima Willett with the label cooperi. This was done on the assumption that the type of V. cooperi was worn and did not show the fine spiral striae. This was in error and the many correspondents who received specimens from the Burches labelled V. cooperi are requested to change the label to read V. tenuissima Willett,1944. We have never dredged a single specimen of typical V. cooperi. (Burch).

Volvulella californica Dall,1919. Santa Cruz, Calif. (A.G. Smith) to San Diego, Calif. (Dall). Type locality, off Santa Rosa Island, Calif.

This is the least cylindrical of the genus in our fauna tending to be slightly ovate. The spiral sculpture is confined to the anterior end.

Collecting data: Just noted that the dredging of this species in 50 fms. in Todos Santos Bay, Lower Calif. is an extension of the range southward from San Diego. Also dredged off Santa Monica, Calif. in 50 fms. and off Redondo Beach, Calif. in 75 fms. (Burch); San Pedro, Calif. in 30 fms. (G. Willett); 45 fms. off Santa Cruz, in soft green mud (USFC Sta. 4483); 298 fms. off Point Sur, in mud and yellow sand (USFC Sta. 3187) (A.G. Smith)

Volvulella tenuissima Willett,1944. Bulletin, So. Calif. Academy of Sciences vol.43, pt.2,1944,pp 71,72,73, pl.14, fig.1. Range Redondo Beach, Calif. the type locality to Todos Santos Bay, Lower Calif., Mexico.

The original description of this species follows:

" Shell imperforate, cylindrical,very slender; aperture narrow, as long as the shell; rounded in front; spine short. Color grayish white, with brown stain from spine down inner side of aperture to and including the columella. Axial sculpture of growth lines curved toward the extremities; spiral sculpture of exceedingly fine,wavy striations that cover the entire surface of the shell, but are visible only with the aid of a fairly strong glass.

This shell is nearest to V. cylindrica Carpenter, but is smaller, much more slender, and lacks the distant spiral striae characteristic of that species."

" The type, No. 1073 Los Angeles County Museum, and numerous additional specimens were collected by John Q. and Tom Burch off Redondo Beach, Calif. in 75 fms. Paratypes are in the U.S. National Museum, California Academy of Sciences, and in the Burch and Willett collections.

The type (not quite adult) measures: Long. 4.3, lat. 1.6 mm. The largest specimen at hand measures 6 x 2.1 mm."

Our fauna contains but the four species but the following keys from the notebook of Mr. A.M. Strong should be of great value to any student working on the group. Mr. Strong covers the southern fauna as well.

Genus Volvulella

Shell more than 7½ mm. in length
9.5 x 3.6 mm Pt. Sur to Gulf of Calif. ... cooperi Dall
Shell less than 5 mm. in length
. Shell smooth or with microscopic growth lines only
.. Length 3½ times the diameter
3.5 x 1.0 mm. Galapagos Islands .... callicera Dall
.. Length 2½ times the diameter
4.25 x 1.75 mm. West Mexico to Panama .... panamica Dall
. Shell with microscopic spiral striations
.. Spiral striations confined to the anterior end
... Length 2½ times the diameter
4.0 x 1.7 mm. Santa Cruz, to Todos Santos Bay californica Dall
... Length 1½ times the diameter
2.75 x 1.8 mm. Panama Bay .... catheria Dall
.. Spiral striations not confined to the anterior end
... Length 3 times the diameter
4.2 x 1.5 mm. West Mexico to Panama .... lowei Strong and Hert.
... Length 2½ times the diameter
4.25 x 1.75 mm. Vancouver to Gulf of Calif..... cylindrica Carpenter.
... Length 3 times the diameter
4.3 x 1.6 mm. Redondo to Todos Santos Bay ..... tenuissima Willett.

Spire involved, apex covered, with a more or less distinct spine
. Surface smooth or with microscopic lines of growth
.. Apical spine separated from the outer lip by a sulcus
4.25 x 1.75 mm. Panama .... panamica Dall
.. Outer lip rounding into the apical spine
... Young with a short spine, in the adult obsolete
9.5 x 1.75 mm Pt. Sur to Scammons Lagoon ..... cooperi Dall
... Spine short, outer lip falling a little short of the end. 3.5 x 1 mm Galapagos .... callicera Dall

. Anterior end with a few microscopic spiral striations
.. Apical spine short, not extending beyond the outer lip
4 x 1.7 mm. Santa Cruz to Todos Santos Bay .. californica Dall
.. Apical spine hardly perceptible
2.75 x 1.8 mm. Panama Bay .... catharia Dall
. Both anterior and posterior end with spiral striations
4.2 x 1.5 mm. Gulf of Calif. to Panama ..... lowei Strong & Hertlein
. Entire surface with distant spiral striations
4.25 x 1.75 mm. Vancouver to Gulf of Calif. cylindrica Carpenter
. Entire surface covered with fine wavy striations
4.3 x 1.6 Redondo to Todos Santos Bay ..... tenuissima Willett

The southern species covered by the above key are V. panamica Dall, 1919 - V. catharia Dall,1919- V. callicera Dall,1919- V. lowei Strong and Hertlein,1937.

Family SCAPHANDRIDAE

Genus Scaphander Montfort,1810 Type (by original designation),Bulla lignaria Linnaeus.

" Shell external, ovate, imperforate, reaching a large size; spire involute, apical perforation shallow, closed by a callus; aperture large, wide, anterior part broadly expanded; inner lip closely appressed; parietal wall covered with callus; sculpture consisting of narrow spiral grooves." (Woodring, Carnegie Inst. Publ. No.385, p.126,1928).

Scaphander willetti Dall,1919. Forrester Island, Alaska.

Genus Bulla Linnaeus,1758. Type (Absolute tautonymy): Bulla naucum Linnaeus. (Syn: Atys Montfort,1810.)

A shift of a familiar name from the group to which it has been applied for many years to replace another well known name is a matter that should be studied closely by all members. We are reluctantly accepting the change in the face of unquestionable evidence. This matter was first brought to our attention by Dr. Joshua L. Baily Jr. (Per. Comm. Feb.,1945) " When you come to discuss the genus which was formerly called " Bulla", you might point out that this name is not available owing to an earlier type designation of Bulla naucum by Linnaeus, who referred to this species as " the Bulla". This action, according to Bartschand Rehder who have supplied the data makes the name Bulla apply to the group formerly called Atys. Furthermore, the two names Bulla and naucum, have the same meaning, so that the species becomes type by tautonomy. As Bullaria was proposed as a substitute for Bulla, it must take the same type,and is also not available. The earliest available name appears to be Vesica Swainson,1840. Rehder in supplying this data refers to Article 30d and Opinions 6 and 55 of the International Code .

This result shows well the ridiculous conclusions to which one must come if one attempts to follow the rules of the International Commission. Bartsch thinks that the genus Bulla-- Vesica is not sufficiently large or important to justify an appeal to the commission to exercise its plenary powers of suspending the rules until Bulla can be placed on the official list with B. ampulla designated as type. Personally I feel that it is of sufficient importance. I believe Bartsch's and Rehder's interpretation of the name and the rules is correct,and unless such an appeal is taken we will have to make this undesirable shift of terms."

Dr. A. Myra Keen discusses the matter as follows (Per. Comm. March 1945) " I should like very much to find a loophole in the Bartsch and Rehder argument re Bulla but regret that I cannot. Below is a complete transcript of the evidence:

Linnaeus,1758, proposed the genus Bulla with some 23 species, no.6 of which is --

" Naucum.332.B. testa rotundata pellucida transversim substriata utrinque umbilicata.
Rumph. mus. t. 27. f.H. Bulla
List conch. 4. f. 9. c. 10. t. 1. f. ult.
Gualt. test. t. 13. f. GG.
Argenv. conch. t.20. f.Q.
Habitat in Asia"

It is the use of the word " Bulla" following the citation of figures in Rumphius that will change our concept of the genus. Throughout the " Systema Naturae" Linnaeus occasionally quotes the names, sometimes uninomials, sometimes binomials, sometimes polynomials, used by these pre-Linnaean authors. I have checked as many as we have original literature on to make sure that he is consistent and he seems to be. Although I do not have Rumphius at hand, it is safe to assume from other examples that Rumphius used " Bulla" in the sense of a specific name. Now the International Rules, Art. 30d, as pointed out by Drs. Bartschand Rehder state: " If a genus, without originally designated or indicated type, contains among its original species one possessing the generic name as its specific name or subspecific name, either as valid name or synonym, that species or subspecies becomes ipso facto type of the genus.(Type by absolute tautomymy)."

Opinion 16, which is a further clarification of this Rule, states: " In deciding whether a case of absolute tautonymy is present, the citation of a clear prebinomial specific name in synonymy is to be construed as complying with the demands of Art. 30d. Examples: Equus caballus (Equus cited in synonymy in the sense of ' the horse')." (Which is precisely equivalent to the citation of Bulla of Rumphius.)

Glancing through the " Systema Naturae" under molluscan genera, I find only three genera in which the rule of absolute tautonymy may be invoked (though, of course I may have missed some). Bulla we have just discussed; Ostrea would take the type O. edulis - fortunately the same as designated later by Children; and Pinna, for which Grant and Gale have already invoked this principle. It is ironic that they overlooked the Bulla. And I, too, overlooked it.

I am inclindd to agree with Drs. Bartschand Rehder on the undesirability of petitioning for a suspension of rules, though on different grounds. It seems to me the fewer exceptions we ask for, the sooner stability will be achieved. This change is unpleasant, yes, but once made it should be permanent. Our species of Atys will now be Bulla; our species of " Bulla" will be Vesica.

The data for Vesica Swainson,1840 are: Treatise on Malacology, p. 360. Type (by subsequent designation, Gray,1847), Bulla ampulla (Linne)"

The following description of the genus Bulla is obviously the description of the genus we have known as Atys. " 'Bulla' has a fold on the columella and the aperture projects over the vertex of the shell as a fold, in a manner somewhat similar to the manner in which the columella fold projectsabove the vertex of the body whorl. There are usually spiral striations on the shell and typically a small umbilicus is present. "

For discussion of the species of Bulla see page 29.

Genus Diaphana Brown,1827. Type. Diaphana minuta Brown.

This genus differs from Acteocina and Retusa in possessing a radula, in the absence of stomach plates etc. The shell is more globose and fragile than in Acteocina and Cylichna, with a large umbilicus, thin columella and without distinct sculpture. The lack of epipodial lobes and of uncini (radula teeth) also distinguish this genus.

Diaphana brunnea Dall,1919. Kodiak Island, Alaska. This species is figured in Oldroyd, vol.2, pl.2, fig.15.

Diaphana californica Dall,1919. Monterey , Calif. (Smith) to South Coronado Island,Mexico (Willett). Type locality, Long Beach, Calif.

This species is figured in Oldroyd, vol.2, pl.2, fig.12.

Collecting data: 10-25 fms. in sand and also in a kelp holdfast, Monterey Bay. This is an extension of range. I also have 2 specimens collected at Reef Pt., Orange Co. (A.G. Smith); South Coronado Island Mexico at low tide in sand under rocks (G. Willett); Malaga Cove, Redondo Beach, Catalina Island (G. Willett); Redondo Beach in 25 fms. (Burch).

Mr. George Willett has collected this species at Ketchikan, Alaska which is a great extension of range. Correct the above stated range to read Ketchikan, Alaska (Willett) to South Coronado Island (Willett).

Diaphana globosa Loven,1846. Bering Strait and Arctic Ocean. Circumboreal. (Dall).(Krause). Type locality. Scandanavia.

Genus Brocktonia Iredale,1915. Proc. Malac. Soc. v.11, p. 340.

" I propose this name for Cryptaxis crebripunctatus Jeffreys, Proc. Zool. Soc. 1883, p. 398, pl.44, figs.11 a-c: between Hebrides and Faeroes. This shell does not really fall into Cryptaxis Jeffreys,1883, which is moreover invalid, and for which Cossmann (Essais Paleoconch. comp. vol.1, p. 90, 1895) has provided the substitute Clistaxis." (Iredale).

" This shell resembles Cylichna, but has the spire almost concealed." (Dall).

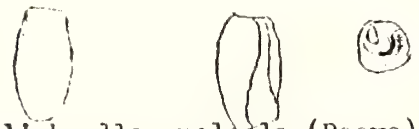
Brocktonia polystrigma(Dall)1908. Newport Bay, Calif. (Strong) to San Diego. Type locality, off entrance to San Diego Harbor in 50 fms.

Collecting data: Off Newport Bay in 20 fms. (A.M. Strong).

Genus Cylichna Loven,1846. Type (by subsequent designation, Hermannsen,1852), Bulla cylindracea Pennant.

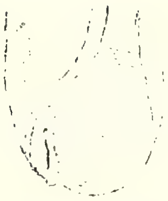
This genus includes small, cylindrical shells with the posterior end truncated and with the spire involute, leaving a small apical concavity. The aperture is long and narrow, dilated below and the columella bears one oblique fold on its base. Sculpture is absent or confined to fine spiral striae and growth lines.

Cylichnella Gabb,1872 differs from Cylichna in possessing two columellar folds. The California species, according to shell characters, should belong to Cylichna and cannot be placed in Cylichnella. Anatomical characters, now largely unknown, may require a revision of the group. Grant and Gale,1931. See figures below. Tracings of original figures.

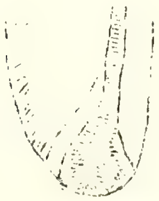


Cylichnella nucleola (Reeve)

Cylichnella occulta Mighels



Cylichnella bidentata d'Orbigny



Cylichna attonsa Carpenter

Cylichna alba (Brown), 1827. Both the rangeand the name alba have been seriously questioned in our fauna. Dr. Dall gave the range in Bulletin 112 " Circumboreal. Arctic Ocean to Monterey". It has been reported as far south as San Diego. Johnson gives the range on the Atlantic as " Green-land to Block Island, R.I. and North Carolina. Circumboreal, 10-1091 fath." andalso lists a subspecies C. alba corticata Beck from Greenland. Type locality is Greenock, Great Britain (fide Grant and Gale,p.453).

In the first place perhaps we should consider the question of whether or not our Pacific coast species is conspecific with the Atlantic C. alba. Dr. A. Myra Keen (Per. Comm. March,1945) " I believe our species called Cylichna alba Brown is misidentified and that it is distinct from the Atlantic species. Ours is more cylindrical, wider near spire, longer, with thicker lip and a stronger spiral ridge at the apex." A further note from Dr. Keen " C. alba (Brown) is a species dubium as far as our collection is concerned. The specimen figured in Oldroyd (vol.2, pt.1, pl.2) is obv-iously misidentified. I believe it is C. nucleola (Reeve); the specimen is from Icy Cape, Alaska. " But on the other side we have the following note from Mr. George Willett of the Los Angeles Museum " Myra Keen may be right that there are slight differences between Atlantic and Pacific spec-imens of Cylichna alba, but a few years a go I compared the two (using Atlantic specimens from the Chace collection), and it seemed to me that they were enough alike to be conspecific. As you know, most of my living specimens are not " glossy and white", as the description calls for, but some of the young ones might be so described."

This species is less elongate and less cylindrical than C. attonsa, and it does not have the anterior portion of the lip produced as does C. diegensis. Apex bearing a fold and is not perforated as in C. diegensis.

The consensus of opinion seems to be that the species we now know as C. alba from this coast should be redescribed and renamed either as a new species or a subspecies at least.

Collecting data: Craig and Ketchikan, Alaska in 15-30 fms. (G. Willett) " Mackenzie Gordon and I are inclined to doubt whether alba is a species of the Monterey fauna, believing that it is northern. We have used the following name for the common Monterey species- C. attonsa " (A.G. Smith); Drier Bay Knight Island, Pr. Wm. Snd., Alaska,1923 in 10 fms. mud (W.J. Eyerdam); Akutan Island, Aleutian Islands, dredged 1934 (I. Norberg) (W.J. Eyerdam).

Cylichna nucleola (Reeve),1855. Arctic Ocean to Kodiak Island, Alaska. Circumboreal. Type locality, North of Beechy's Island, Arctic.

Dr. A. Myra Keen (Per. Comm. March,1945) " I dnclose a tracing of the original illustration. You will see that the dimensions are slightly different from the Oldroyd specimen, but there seems to be some variability. If my determination is correct, the range of C. nucleola should be revised to 57-72 (Kodiak I. to Arctic.)"

Cylichna occulta(Mighels), 1841. Circumboreal. Point Barrow to Aleutian Islands" (Dall,1921). Johnson gives the Atlantic range as " Greenland to Maine". Type locality, Westbrook, Maine. Described from a fossil. fide Oldroyd, p. 40.

Dr. A. Myra Keen advises (Per. Comm. March,1945) " C. occulta(Mighels is another doubtful species. I enclose a tracing of the original figure from which you can realize the impossibility of recognizing it. One would need topotypic specimens for comparison, which we do not have."

Cylichna diegensis (Dall),1919. Santa Monica, Calif. (Burch) to Cape San Lucas. Dr. Dall in Bulletin 112 listed Vancouver Island ?

This species is distinguished by the anterior projection of the aperture and the much thickened pillar lip. It is truncate at the apex and is shorter and fatter than C. attonsa. It has a perforated apex. The original description mentions "... the apex exhibiting a funicular depression ending in a minute perforation". Dr. A. Myra Keen writes (Per. Comm. March 1945) " We have one very worn specimen which is being sent you on loan. It shows the funnel-shaped apex mentioned by Dall. This specimen was identified by Dr. Dall himself." We are figuring this specimen on our plate. It seems to be quite a distinct species, in our Recent material. However, Mr. George Willett observes (Per. Comm. March,1945) " There has been much confusion between this species (referring to C. alba), diegensis, and attonsa in literature, particularly in publications about fossils. In the Del Rey fossils I found specimens that appeared to connect the two latter species, but have not found them in the Recent."

Collecting data: Dredged off Santa Monica, Calif. in 20 fms., off Avalon, Catalina Island in 25 fms., off Redondo Beach, Calif. in 25-50 fms. one record off Redondo in 75 fms., Rocky Point in 40 fms., Malaga Cove in 15 fms. (Burch); San Pedro, Catalina Island, Point Loma in 20-30 fms. (G. Willett).

Los Coronados (Willett

Cylichna attonsa (Carpenter), 1864 Kodiak Island, Alaska to San Diego, Calif. Dr. A. Myra Keen states (Per. Comm. March,1945) " C. attonsa (Carpenter), 1864 (not 1865). Synonym not previously mentioned: C. propinqua E.A. Smith, Ann. Mag. Nat. Hist., ser.4, vol.9, 1872, p.351, type locality, Vancouver Island. The range as given by Dall and copied by me is obviously incorrect, as the type locality of C. attonsa is Puget Sound. According to specimens in our collection the range should be 33-56:45 (i.e. San Diego to Kodiak Island, Alaska."

This species is more elongate than C. diegensis. The aperture is very narrow for 2/3 of the length and then widens out below. Columella slightly twisted. Rounded off at apex. Apex not perforated as in C. diegensis not folded as in C. alba.

Collecting data: Ketchikan, Craig, Forrester Island, Alaska to Los Coronados in 10-15 fms. (G. Willett); 10-40 fms. in sand and mud off Monterey, Calif. (A.G. Smith); Santa Monica,Calif. in 20 fms., Malaga Cove in 10 fms., Redondo Beach in 25 fms., Todos Santos Bay, L.C. in 35 fms. Our experience has been to find this species less common than diegensis. (Burch).

On the following page we will give you a key to species from the note book of Mr. A.M. Strong. Mr. Strong covered the species from Point Conception south. This includes some of our species, those from southern California, and the species from the southern fauna.

Genus Cylichna

Columella simple, without plaits .... (Cylichnium)
. Length less than twice the diameter
9.75 x 5 mm Panama Bay, 1270 fms. ...... pizarro Dall ,1908
. Length more than twice the diameter
.. Shell with microscopic incised spiral lines
9.0 x 4.0 mm Panama, 322 fms. .... atahualpa Dall, 1908
.. Shell with microscopic lines of growth only
8.0 x 3.5 mm Santa Monica to Cape San Lucas diegensis Dall,1919
Columella with plaits
. Columella with a single plait .... (Bulinella)
.. Shell smooth, without a spiral sculpture
Dountful west coast .... alba Brown,1827
.. Shell with incised microscopic spiral lines
...Length 1½ x the diameter
2.6 x 1.5 mm Gulf of Calif. to Panama ..... defuncta Baker & Hanna
... Length 2 or more times the diameter
.... Shell more than 7.5 in length
..... Apical lip rising little above the apical pit
9.5 x 3.7 mm Kodiak Id. to Los Coronados ... attonsa Carpenter,1864
..... Apical lip rising well above the apical pit
8.9 x 4.0 mm Gulf of California .... fantisma Baker & Hanna
.... Shell less than 7.5 mm in length
..... Apical lip not rising above the apical pit
6.0 x 2.5 mm Panama, 1270 fms. .... inca Dall,1908
.....Apical lip rising well above the apical pit
...... Incised spiral lines fine, close spaced
6.7 x 3.2 mm Panama ....stephensae Strong &
...... Incised spiral lines strong, well spaced Hertlein
4.9 x 2.3 mm Panama .... valeronis Strong &
. Columella with two plaits Hertlein
.. Length 2 times the diameter
3.0 x 1.6 mm Panama ....tabogaensis Strong &
.. Length 2½ times the diameter Hertlein
3.0 x 1.2 mm Panama .... zeteki Bartsch,1918

ADDITIONS AND CORRECTIONS

Minutes #47, p 7 - continuation from bottom of page under Corolla vitrea (Heath and Spaulding),1901 which was described as Cymbuliopsis. The original description follows; with note from Dr. A. Myra Keen (Per. Comm. March,45.

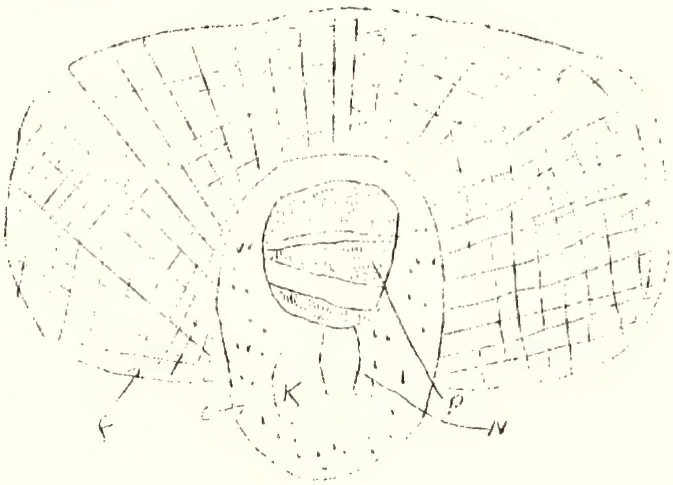
" Cymbuliopsis vitrea, a new species of Pteropod" by Harold Heath and M.H. Sapulding, Proc. Acad. Nat. Sci. Philadelphia for 1901, publ. Oct.29,1901, pp. 509-511, 1 text-figure, was evidently overlooked by Dall and successors. I did not attempt to comb the literature back of 1907. Heath and Spaulding indicate in a footnote that Cymbuliopsis must fall as a synonym of Corolla Dall, so that we should cite this as Corolla vitrea (Heath and Spaulding). Their description is mostly discussion. The following may be taken as the essence:

" The shell or casque, slightly asymetrical, possesses the characteristic slipper form and bears on its external surface numerous small rounded tubercles which become smaller and more closely grouped together near the posterior-dorsal surface. Its aperture is large, unarmed and much wider than in C. ovata,but is almost identical with that of C. calceola, and as in the latter, its large cavity extends to the dorsal extremity. The maximum length of the casque is 4 cm., with a width of 2.5 cm.

" The broad, perfectly symmetrical flattened proboscis constituting the head region is in contact with the upper surface of fin, yet free from it to a point immediately in front of the central nervous system..."

Below is a tracing of the original text figure which was accompanied by the following explanation:

" Cymbuliopsis vitrea, ventral view, natural size. C.,casque or 'shell f., foot or fin; k. kidney within mantle cavity represented by stippled line; n. , nucleus or viceral mass, showing termination of intestine and pigmented cap; p. pallial gland."



Minutes #35, p.6 and Minutes #45, p.6- The range as stated in our list is Graig, Alaska to Newport Bay. Mr. W.J. Eyerdam took the species Pecten hericius pugetensis I.S. Oldroyd,1920 from Hinchinbrook Island, Alaska (Norberg).

Minutes #35, p.6 and Minutes 45, p.6. The range as we stated it is from Forrester Island, Alaska south. It should read Izhut Bay, Alaska south. This is an extension of range some 700 miles N. westward. Eyerdam dredged the species P. hindsii jordani Arnold at Izhut Bay, Afognak Id., Alaska in 1922.

Minutes # 35, p. 14a and Minutes #44, p.7. The range as published is from Forrester Island south. W.J. Eyerdam collected the species Lima subauriculata Montagu in 1922, at Izhut Bay, Afognak Island, Alaska. This is a northward extension of range of some 700 miles.

Minutes #45, p.11- Astarte arctica Gray,1824. In Minutes #39, p.6 we listed the collection of this species by Mr. W.J. Eyerdam from Hinchinbrook Island, but negected to alter the range in the final list. The range should read. to Hinchinbrook Island westward. This is an extension of range of about 600 miles.

Minutes #40 p 7 and # 45 p 13- Lucina californica Conrad,1837. Range as published was Crescent City, Calif. south. W.J. Eyerdam reports the species from sandy beach at Alki Point, Seattle, Wash and also Harbor Island. This is an extension of range of about 500 miles northward.

Minutes # 42 p 19 and #45 p 16. Petricola californiensis Pilsbry & Lowe, 1932. Our published range is Monterey south. Mr. W.J. Eyerdam reports the species from Newport, Oregon which is an extention of range of some 700 miles northward.

Minutes # 43 p 14 and # 45 p 17. Macoma quadrana Dall,1916. Range extended northward about 500 miles to Hinchinbrook Id.,Alaska (Eyerdam)(Norberg).

MARINE SHELLS WITH EXTENDED RANGES OR NEW TO THE PANAMIC WEST COAST REGION.

By Walter J. Eyerdam.

In reviewing the recent book " Panamic Marine Shells" by Maxwell Smith, which covers the marine shells of the Panamic regions, I find that there are over 450 species and subspecies in my private collection that are represented. I find that many of these have extended ranges or are otherwise new to the list of " Panama Marine Shells".

Most of these shells that I have were collected during the few brief stops made by the steamer Capoc on the way to Callao in Sept.,1938 and the return to the states on the Condor in June,1939 when she stopped at Corinto,Nicaragua. Only about two hours of collecting were spent near Corinto and the tide was only ordinary. The findings proved very interesting and it is ptesumed that the shell fauna in this area must be exce dingly rich in species. Even with the persistent collecting of the late Herbert N. Lowe in these waters there is still much to be discovered by others of like dilligence.

1. *Diadora inaequalis inaequalis* Sowerby.
   Previous range.. Lower Calif. to Taboga Id.
   Extended range.. Talara,Peru (about 1000 miles south.)
2. *Acmaea subrotundata* Carpenter.
   Previous range.. Panama (type locality).
   Extended range.. Gulf of Honduras (about 800 miles N.W.)
3. *Acmaea stipulata* Reeve.
   Previous range.. Panama (type locality).
   Extended range.. Gulf of Fonseca,Honduras (about 800 miles N.W.)
4. *Hipponix panamensis* C.B. Adams.
   Previous range.. Panama (type locality).
   Extended range.. Mazatlan,Mexico (about 2500 miles)
5. *Turritella leucostoma* Valenciennes.
   Gulf of Fonseca,Honduras- Not previously reported from the Pacific.
6. *Cerithidea hegewischii pulchra* C.B. Adams.
   Previous range- Panama Republic
   Extended range- Corinto,Nicaragua and Gulf of Nicoya,Costa Rica. (about 800 miles N.W.)
7. *Eupleura nitida* Broderip.
   Previous range.. Nicaragua to Bahia de Caraques,Ecuador.
   Extended range.. Acajutla,Salvador (about 200 miles westward)
8. *Architectonica nobilis* Bolten.
   Corinto, Nicaragua. Not reported in " Panamic Marine Shells".
9. *Littorina mauritiana* Lamarck.
   Panama coll. by W.J. Eyerdam. Perhaps a synonym of another species.
10. *Tegula (Chlorostoma) globula* Carpenter.
    Acajutla, Salvador- collected by W.J.E. for first record for Central America.
11. *Columbella cribraria* Lamarck.
    Corinto, Nicaragua. Not in " Panama Marine Shells".
12. *Cancellaria ovata* Sowerby.
    Corinto,Nicaragua. Not in " Panama Marine Shells".
13. *Bifurcium harpaeformis* Sowerby.
    Previous range.. Montego and Panama Bays.
    Extended range.. Acajutla, Salvador (about 700 miles N.W.)
14. *Cassis canaliculata* Bruguiere.
    Gulf of Fonseca,Honduras. Not in " Panama Marine Shells"
15. *Leucozonia cingulata* Lamarck.
    Previous range.. Gulf of California to Panama.
    Extended range.. Supe,Peru (about 1000 miles southward).

16. Oliva julietta Duclos.
Previous range.. Central America
Extended range.. Corinto,Nicauragua and Mazatlan,Mexico.

17. Olivella semistriata Gray.
Corinto,Nicauragua. Not in " Panama Marine Shells"

18. Siphonaria lineolata Sowerby.
Previous range.. Payta,Peru.
Extended range.. Corinto,Nicauragua and Valparaiso,Chile (about 1700 miles north and 1800 miles south.)

19. Ellobium stagnalis d'Orbigny.
Previous range.. Panama to Guayaquil,Ecuador.
Extended range.. Gulf of Fonseca,Honduras. (about 800 miles N.W.)

20. Melampus trilineatus C.B. Adams.
Previous range.. Panama (type locality).
Extended range..Gulf of Fonseca,Honduras.

21. Macoma (Psammacoma) cognata C.B. Adams.
Previous known range- Panama (type locality).
Extended range.. Corinto,Nicauragua. (about 800 miles N.W.)

22. Macoma grandis Hanley.
Previous range.. Central America.
Collected by W.J. Eyerdam at Corinto,Nicauragua.

23. Mactra (Harvella) elegans Sowerby.
Corinto,Nicauragua. Not previously reported from Central America.

24. Mactra hemphillii Dall.
Previous range.. San Pedro to San Diego, Calif.
Extended range.. Corinto,Nicauragua. (about 1600 miles southward).

25. Mactra (Micromactra) vanattae Pilsbry and Lowe.
Previous range.. Gulf of Fonseca to Panama City.
Extended range.. Acajutla,Salvador. (about 200 miles westward.)

26. Mytilus charruanus d'Orbigny.
La Union,Salvador. First record for Central America.

27. Donax navicula Hanley.
Gulf of Fonseca,Guatemala. First record for Central America.

28. Pseudocyrena mexicana Broderip and Sowerby.
Previous range- Panama.
Extended range.. Corinto,Nicauragua and Mazatlan,Mexico. (about 2500 miles N.W.).

29. Corbula nasuta Sowerby.
Previous range.. Guaymas,Mexico to Ecuador.
Extended range.. San Felipe, Lower Calif. collected by Earl Huffman (about 200 miles northward).

30. Solen mexicanus Dall.
Previous range.. Gulf of Tehuantepec to San Juan del Sur.
Extended range.. Digg's Pt., Gulf.Calif. by Earl Huffman. 900 mi. N.W.

31. Chionecrenifera Sowerby.
Previous range.. Mazatlan,Mexico to Payta,Peru.
Extended range.. San Felipe, Gulf. of Calif. (about 500 mi. N.W.)

32. Corbicula radiata Hanley. (brackish water)
Collected by W.J. Eyerdam at Corinto,Nicauragua and Gulf of Fonseca, Honduras in Mangrove swamps.. not previously reported from this region.
Corbicula radiata Deshayes, and Corbicula radiata Parr. are synonyms of Corbicula fluminalis Deshayes and are native to Egypt, according to Temple Prime in his catalogue of the Corbiculidae.

Genus Bulla Linnaeus,1758. (continued from bottom of page 21)

Bulla casta (Carpenter),1864. Catalina Island to Gulf of California.
Collecting data: Catalina Island (A.M. Strong); San Pedro, fossil (G. Willett).
Type locality (fide Oldroyd), Cape San Lucas, Lower Calif.

Bulla nonscripta (A. Adams), 1850. San Diego, Calif.
Collecting data: " I have what I thought might be this species from Catalina Island in 60 fms.,and fossil, but it differs from Tryon's figure and I do not know what it is." (G. Willett).

Bulla chimera (Baker and Hanna),1927. This species is of the southern fauna ranging from Lower California to Acapulco, Mexico. It seems to be the only other described species from this coast.

Bulla esteroensis, new species. Plate II, fig.24.

Shell ovate in outline; color mottled brownand white; sculpture of spirally incised lines over the entire body whorl, more prominent on the lower one third; spire sunken with a deep pit the sides of which are striate with seven spiral grooves; aperture produced both posteriorly and anteriorly but more produced posteriorly; aperture extends behind the inner lip as it joins the body whorl; outer lip gradually curved becoming more acutely curved as it approaches the columella; inner lip descends upon the inner edge of the sunken spire, lip twisted behind the vertex; columella twisted and faintly grooved with a shallow chink behind it. Height 3 3/4 mm.; diameter 2 1/5 mm.

The type specimen from the Estero de Punta Banda below Ensenada, Mexico has been sent to the U.S. National Museum. A paratype is in the Burch collection and it seems that a specimen from San Diego in the Stanford University collection, # 27554, (Plate II, fig.21) is of this species.

Bulla nonscripta (A. Adams),1850 (Plate II, fig. 23) has a straight outer lip whereas that of B. esteroensis is decidedly curved. It is also obvious that the general form of B. nonscripta is cylindrical whereas that of B. esteroensis is ovate. Bulla casta (Carpenter),1864 is much more elongate and is also much more swollen anteriorly.

John Q. Burch.

#47 p 30 April,1945.

Figure Explanation of Plate

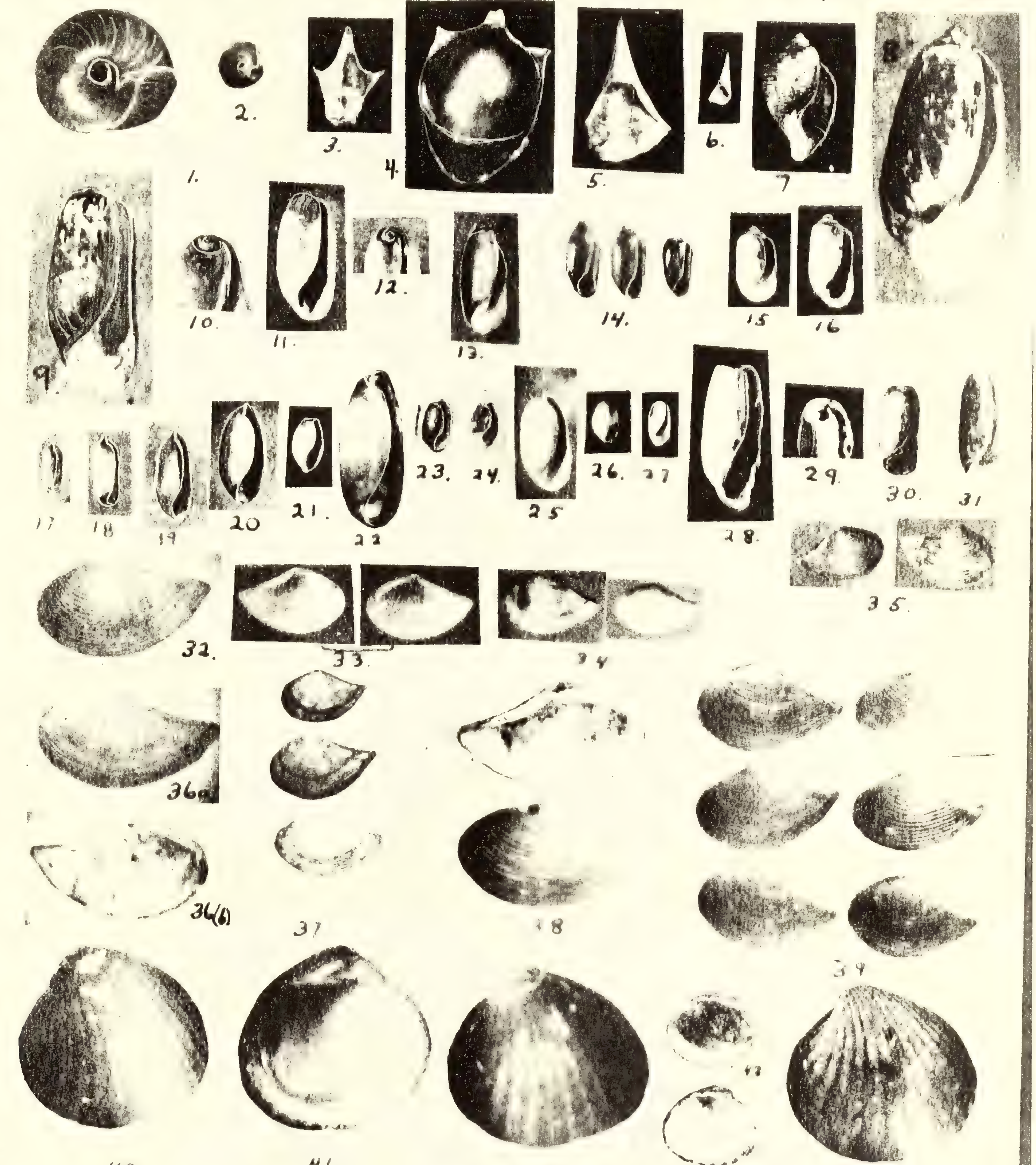
1. Spiratella pacifica(Dall) Forrester Island, Alaska(Willett) x4
2. " " Redondo Beach,Calif. 75f.(Burch) x 4
3. Cavolina laevigata Orb. Catalina Island, 30 f. (Willett) x 4
4. " tricuspida (Rivers) Catalina Id. (Willett) x 4
5. Clio exeonta Gld. Catalina Id. 200 f (Willett) x 4
6. Styliola falcata Gld. Catalina Id. 30 f. (Willett) x 4
7. Acteon painei Dall. Catalina Id. 30-40 f. (Strong) x 3
8. Acteocina culcitella (Gld.). Redondo Beach 100 f. (Burch) x 3
9. " intermedia Willett. Redondo Beach 75 f (Burch) x 3
10. " " " " " " (oblique view).
11. " eximia (Baird). Friday Harbor, Wash. (Kincaid) x 3
12. " " " " " " (oblique view)
13. " magdalensis Dall. Newport Bay (Strong). x 3
14. " inculta (Gld.). San Diego Bay (Baker) showing gradation to
" planata (Carp.) from the same set.
15. " smirna Dall. San Martin Island (Baker) x 3
16. Coleophysis harpa (Dall). Friday Harbor, Wash. (Kincaid) x 3
17. Volvulella cylindrica (Carp.). Redondo Beach 30 f (Burch). x 3
18. " tenuissima Willett. Redondo Beach 75 f (Burch) paratype.
19. " californica Dall. Redondo Beach 100 f m, (Burch) x 3
20. Bulla casta (Carp.) San Pedro Pleistocene (Willett). x 3
21. Bulla esteroensis Burch. San Diego,Calif. (Baker:Stanford Coll.27554
22. Bulla chimera (Baker & Hanna). Oaxaca,Mexico,50 f. (Willett). x 3
23. Bulla nonscripta (A. Adams). Sowerby, Thes. Conch.,1844, vol.2,pl.125
24. Bulla esteroensis Burch. Estero below Ensenada. Type specimen. x 3
25. Bulla cf. nonscripta (A. Adams). Catalina Island, 60 f. (Willett).
26. Diaphana californica Dall.Redondo Beach, 50 f (Burch) x 3
27. Brocktonia polystrigma (Dall). Newport, Calif. 20 f. (Strong). x 3
28. Cylichna diegensis Dall. La Jolla, Calif. 100 f. Stanford Coll. x 3
29. " " " " " " (Oblique view).
30. " " " Redondo Beach, 50 f M. (Burch) x 3
31. Cylichna attonsa Carp. Redondo Beach, 25 f. G. (Burch). x 3
32. Nuculana penderi redondoensis Burch. Redondo Beach,25f. Type.(MQ 454)
33. " " " inside, x 2.5 Type.
34. " " " 2 other spec. from Redondo Beach 25 f. G. x1.5
35. " " " 2 spec. fr Redondo Beach 75 f. M. x 1.5
36. " " " San Pedro, Calif. 20 f (Willett) x 3
37. " " " Santa Cruz Island 50 f (Burch) x 1.5
38. Nuculana penderi Dall. Craig,Alaska (Willett)(Burch MQ452) x 3
39. " " " " 6 spec. x 2.5
40. Cardita ventricosa redondoensis Burch. Redondo Beach,100f.Type x 2.5
41. " " " " " " (Burch MS443)
42. " ventricosa Gld. San Juan Islands, Puget Sound. MS442 x 2.5
43. " " " showing spawn inside shell x 1
44. " " " " inside of shell x 1
45. " " " Puget Sound (Kincaid) (Burch MS4516) x 2.5
46. Macoma morroensis Burch. Morro Bay,Calif. Type. (Burch) x 1.5
47. " " " " "

48,49 Macoma yoldiformis Carp. Newport Bay (Caruthers). x 1.5

50,51 Macoma alaskana Dall. Forrester Island,Alaska (Willett). x 1.5

Note: All magnifications are only approximate.

PLATE II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Nuculana penderi redondoensis Burch,1944. Plate II, figs. 32,33,34,35,
36,37

Shell solid,elongately trigonal, rounded anteriorly, with a sharp posterior beak, equivalve, color light brown. Anterior end shorter than the posterior, the dorsal margin slowly descending and then regularly convex to the ventral margin. Posterior end longer, with a sharp beak, the dorsal margin slightly descending and decidedly concave. Sculpture consists of concentric sharp ridges, close together near the umbones but further down the interspaces are broader than the ridges. Escutchoon very prominent, longitudinally striate, and bounded by a sharp median keel formed by the posterior dorsal margins of the valves. The lunule is an indistinctly outlined narrow space, striate. Hinge teeth V shaped, numbering 18 anterior and 1[illegible] posterior. Length 8 mm.; maximum height 4½ mm.; maximum diameter 3.8 mm.

In Minutes #33, pp 9-10, March,1944 the species Nuculana redondoensis Burch, was figured and the differences between the species and the Atlantic Nuculana acuta Conrad was clearly shown. The possibility that redondoensis might be not more than subspecifically distinct from the northern N. penderi Dall,1910 was discussed. Further study and a comparison with a large series of N. penderi has convinced the author that while redondoensis is easily separable, the relationship is so close that it should probably be described as a subspecies of N. penderi. A comparison of this species with N. penderi from Craig, Alaska,collected by Mr. George Willett (see Plate II, figs. 38 and 39) brings out among other differences in shape that N. p. redondoensis is in fact more elongate. However, the most obvious difference is that specimens of N. p. redondoensis tend to be consistently more restrate and more pointed with a greater curve in the posterior dorsal margin.

A type specimen, dredged off Redondo Beach, Calif. in 25 fathoms on gravel bottom, has been selected and placed in the U.S. National Museum. Paratypes will be available for all western museums wishing them.

John Q. Burch.

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Cardita redondoensis Burch,1944. Plate II, figs. 40 and 41.

Shell suborbicular, slightly inequilateral, with 22 to 24 well defined rounded nodulose radiating ribs. The concentric sculpture consists of flat plates when viewed under a strong lens. The entire shell is covered with a light brown hairy epidermis. The umbones are slightly eroded. Length 14½ mm.; height 13.8 mm; diameter 10 mm.

In Minutes #39, pp 14,15,16 a species was discussed and figured which was given the subspecific name Cardita ventricosa redondoensis Burch,1944. Further study has convinced the author that this species is sufficiently distinct to warrant a specific name, A type specimen, from 100 fathoms off Redondo Beach on mud bottom, has been selected and placed in the U.S. National Museum. Paratypes will be available to western museums wishing them.

The most obvious difference between this species and C. ventricosa (see Plate II, figs. 42-45) is that it is more ventricose. However, in addition to the difference in dimensions, a study of the sculpture will reveal that the radial ribs are much more pronounced on redondoensis, and there is a distinct difference in the character of the concentric sculpture, that of C. ventricosa consisting of inconspicuous nodular incremental lines, whereas that of redondoensis seems to assume the form of a series of flat ' plates'. John Q. Burch

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In Minutes #39, p. 13, September,1944, the name Cardita bailyi Burch was proposed to replace the name Cardita nodulosa Dall,1919, the specific name nodulosa being preoccupied by both Lamarck and Reeve.

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A NEW MACOMA FROM CALIFORNIA

BY Thomas A. Burch

Many collectors from California have specimens of an undescribed species of Macoma either in their sets of M. yoldiformis or labelled with question marks. Most of these specimens have come from Morro Bay, San Luis Obispo County,Calif. We have also dredged them from 10 fathoms off Monterey, Calif.

Macoma morroensis sp. nov. Plate II, figs. 46 and 47.

Shell small,shiny white, elliptical, compressed,height three fourths the length of the shell; umbones posterior to midline, nearly equilateral; anterior end elongated and bluntly curved; posterior end obtusely angulated and reflected slightly to the right at the posterior tip. Ligamental area nearly straight. Sculpture consists only of obscure incremental lines of growth; teeth minute; pallial sinus deep and high. Length 21; posterior to hinge 3.6 ; height 12.5 mm.

This shell is similar to Maçoma yoldiformis Carp. (Plate II, figs. 48,49) but is proportionately much higher, the height being 3/4 the length in M. morroensis and only ½ the length in M. yoldiformis. The posterior end of M. morroensis is less attenuated and lacks the "scooped out" ligamental area of M. yoldiformis.

Macoma alaskana (Plate II, figs. 50,51) differs from this species in that the umbones are much further posterior and the ligamental area slopes abruptly down, resembling Tellina buttoni somewhat in shape.

The type specimen from Morro Bay, California has been sent to the U.S. National Museum. Paratypes are in the collections of M. Caruthers , George Willett, and the Burch collection.

The specimens from Morro Bay are all practically identical, but those from Monterey in the Burch collection vary considerably in height but all are proportionately higher than M. yoldiformis.

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MINUTES OF THE APRIL MEETING OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIF.

The Conchological Club of Southern California met at the usual time and place Sunday, April 1,1945.

There were thirteen members present and one visitor, Ruth Hauser,6851 Simpson, North Hollywood, a friend of Miss Verna Mann of Burbank, who, due to traffic difficulties has not been able to attend the meetings for a long time.

No reports from standing committees wwre available so the assigned lesson was taken up for discussion- the gist of the conclusions will appear elsewhere in the minutes.

Word was received that Mr.and Mrs. Harry Turverof Santa Cruz had been trabsferred from thatcity to the geological department of the Standard Oil Co. at Los Angeles, and we hope they will join us at our future meetings.

The meeting was duly adjourned.

Effie M. Clark, Secretary.

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D.L. Longly, Mo, MM 1/c, 100th Naval Construction Battalion, Co. C-1, c/o Fleet Post Office, San Francisco, Calif. This soldier or should I say sailor's name has been given us by Mrs. Betts of Post Ranch, Terra Bella, Calif. with the comment " I hope some one will be able to contact Don, and know he will be very appreciative." Longly is stationed in the South Pacific and is very much interested in shell collecting and eager to get in touch with othhers in the service with like interests.

Lieutenant John E. Davis, A.C. 0924078, Sq.A, 451 AAF BU, SAAD, Salinas, Calif. The above is the new address of Lieutenant Davis.

Wm. G. Fargo, 506 Union St., Jackson, Michigan. Mr. Fargo has returned to his Michigan home and sent in the following interesting collecting note "Perhaps my best acquisition this season here is a nice specimen of Psammosolen sanctaemarthae Orbigny; 32 x 18 mm. Gulf of Mexico, 15 fms., off Pass-a-Grille, Florida (from a " Grouper" stomach). It may be a record for the east Gulf of Mexico.

William K. Emerson, 2435 Bancroft St., San Diego 2, Calif. " I think the distributional list of Pelecypoda is excellent,and have already put it to use. .. It would indeed be a great help to collectors making exchanges if every shell in future lists would be given a specific number. In this way, all collectors who have lists would merely state the numbers of the shells on the list he has for exchange. As far as West Coast material is concerned, this would save much time and trouble. Nearly anyone you would want to exchange with probably would have the lists. What do you think of the idea?"

The editor thinks it a good one and will adopt the idea for the final list. Emerson continues after giving us his collecting records " Do you know of any one on any of the Pacific Islands who is collecting and might desire to exchange now or build up credit for post war exchanges ? If such a person has plenty of time and excess energy (as many of the fellows on some of the lonely islands) and would be willing to send material, but do not desire to exchange, I will gladly pay the postage for such material."

Allyn G. Smith, 722 Santa Barbara Road, Berkeley, Calif. Allyn calls attention to the laboratory procedure in preparing the Amnicolidae described by Elmer G. Berry " The Amnicolidae of Michigan: Distribution,Ecology, and Taxonomy", Mus. of Zool., Univ. of Mich, Misc. Pub. No.57,1943. Allyn says in his letter " The use of menthol crystals for the anethetization of small fresh water mollusks is of interest. I have used it on small slugs with some success, but would like to see it tried on marine mollusks. If it works on them, we really have a simple and useful method of anethetization. Has Tom or anyone else a method that is even partially successful with marine gastropods?"

Miss Verna Mann,3030 W. Thornton Ave.,Burbank, Calif. This is the new address of Miss Mann. " I want to compliment you on your enlarged Min. of Con. Club Your drawings and untiring efforts are to be commended."

Fred Barnett,80 62nd Pl.,Long Beach 3, Calif. As we know Fred is serving in the Coast Guard and we hear that he has been transferred to Boston, Mass.

Mr. E.P. Baker,417 S. Downey Ave., Downey, Calif. We regret that Ned has had to return to the hospital for another operation on that injured hand.

Carl W. Erickson, 4 Windsor Ave., Auburn, Mass. " ... We organized a conchology club yesterday with a dozen charter members, all of whom have been in the shell class. Several other collectors have signified their intention of joining once we get started. We have no name as yet for the club but are toying with the idea of naming it in recognation of some noted researcher and authority in the field of conchology, living or dead. That is to be taken up at the next meeting. One of the club members, whose occupation is assistant librarian at the Worcester Free Public Library, has prepared an exhaustive bibliography on conchology and we may incorporate that in the minutes of the meeting, mimeographing it in somewhat the same style you use."

Professor Willis G. Hewatt, Prof. of Biology, Texas Christian University, Fort Worth, Texas. We are flattered at the request and pleased to comply with a file of our available back issues.

University of Michigan, Beneral Library, Ann Arbor, Mich. We are pleased to add this name to our permanent mailing list.

John Strohbeen, 315 King St., Santa Cruz, Calif. We have had the pleasure of collecting and dredging with John Strohbeen in Monterey Bay. He is an enthusiastic collector and should have been at all times on our list and a member of our group.

Allyn G. Smith, 722 Santa Barbara Road, Berkeley 7, Calif. " I think you are smart not to consider starting a regular printed publication,particularly at this time. I know that there has been, or there must be considerable pressure brought to bear on you to do this. I admit, the proposition is an attractive one. It would be a fine thing in some ways. But you surely would have a bull by the tail if you attempted it now. Having had some experience as an editor of a magazine under wartime conditions, I know what you would be up against, with printing and the paper situation what it is. There would be nothing but endless grief. So my advice to you is to keep the Club Minutes as they now are- informal and mimeographed. They are just as interesting and valuable as they are. If the club finds the financial end a burden, I would suggest covering the cost by assessing regular dues on the associate and corresponding members- no pay, no minutes. I am sure we would all be willing to do this. You would then be sure of a definite, or fairly definite income, on which you could do some figuring. It's just a thought."

Mrs. Margaret Teare,681 Lafayette Ave.,Buffalo 9, New York. " I wish to correct an error in the spelling of my name- it is " Teare" and not " Veare". I appreciate very much, your sending to me, the minutes etc. of the Conchological Club of Southern California. Being a beginner, they look and read very technical, but the little I do understand is very enjoyable and I know that in time I shall greatly value the information contained in these papers."

Mr. A. Sorensen, 247 Granite St., Pacific Grove, Calif. We trust that Andy has managed to get away on his Mexican excursion. He was having a bit of trouble by his recent letter " .. I went to S.F. to get my tourist permit for Mexico, but did not fare so well in getting reservation on the Pan American or American airlines to Mexico City, Mazatland and Hermosillo. April 13th was their best offer, but I hope to get a phone call bettering that. If nothing earlier comes I shall take train or bus to Guaymas pretty soon. April is fine, May is warmer, and June is hot with rains beginning."

The following new publications are reported by Mr. Allyn G. Smith.

" New State Records of Mollusca from Kansas" by Dorothea S. Franzen, University of Kansas, Trans. Kansas Acad. Sci., 47(2):261-273, pl.1 1944. Reports on a collecting trip through the two eastern tiers of Kansas counties in which a number of land mollusks, some of them from the Ozarkian fauna, were found.

" Observations of Egg-Laying Habits, Eggs, and Young of Land Molluska on the Edmund Niles Huyk Preserve, Renesselaerville, New York" by Wm. Marcus Ingram (Mills College), Am. Mid. Nat. , 32(1): 91-98, 6 text figs,July,1944.

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A brief note from the editot: Our boys are sending back a lot of shells from the Pacific and unfortunately many of them are identified incorrectly by the boys. It is difficult to explain to them that it is impossible to take Hirase's Japanese Shells, or some other work on a particular fauna, and name all the shells from Fiji or New Guinea with it. If some member with access to a large library would write an article on the various books dealing with specialized faunas we would be glad to run it and I think it would be of some value. For example the continent of Australia alone gives us at least five more or less distinct faunas. Your correspondents from Queensland, New South Wales, South Australia, West Australia etc. will send exchange lists with but few duplications and each one will have its own literature. There is no complete work on the entire fauna of Australia. Some sections have a humber of very adequate works ontheir molluscan fauna. New Zealand has been well covered by Hutton, Sutter, Powell etc. Other sections may have books on their molluscan fauna of which I have not heard. My own small library turns up for example a rather good work " The Common Mollusks of Sputh India" by James Hornell,1922 (Madras Fisheries Bulletin, vol. XIV). This is probably still available although I do not know. I note a book " Shells of Peitaiho" by Grabau and King,1928 (Peking Laboratory of Natural History). I have a number of other similar things that would be fine for the boy collecting at that particular spot.

And while talking about books your editor is rather proud of the latest addition to the library. For years it has been a matter of considerable difficulty to find such works as Sowerby's Thes. Conch., Kieners Coquilles Vivantes, Martini and Chemnitz, Hinds etc. etc. Many of our Pacific coast species are figured in these older works and even if they were available for purchase which theyare not the cost would be prohibitive. So we simply went through these large sets and carefully made photographs of every plate on which a Pacific coast species is figured. That this was no small job is indicated by the fact that our binders now contain something over 2000 photographs of plates. And, by the way, we have discovered a good many interesting problems in the process. In the course of time you will no doubt get quite a few of these reproduced in our minutes.

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Major H.S. Mort, 13 Milner St., Mossman, NSW, Australia. " In the last number of the Conchological Club of Southern California, you mention (#42, p 21) letter from Pvt. Conlin), that many curio dealers and others dealing in shells in a small way often have ridiculous localities on their specimens. I suggest that even the larger dealers are nor blameless in this respect. In Webb's book there are many errors in locality: to mention only two of them, he ascribes Haliotis midae and H. rugosoplicata both to Australia whereas midae is a typical S. African shell and the other hails from New Zealand, but neither is found in Australia. Of course, his book is full of mistakes of all kinds

- he places the Andaman Is. in Oceania and Senegambia in the Indian Ocean, lists Dr. J.C. Cox as an American and has hundreds of names misspelt, as well as many of the illustrations wrongly identified. Still in a popular book of that sort we must not expect too much scientific accuracy, as it is a fine book and provides over 2000 species with descriptive matter at a wonderfully low price, but locality errors are always unfortunate. Talking about Dr. Cox I saw, about 50 years ago in Sydney, the identical specimen of Conus gloriamaris which Webb figures on his cover.

Unfortunately shell collecting is not nearly as popular here as I should like to see it, but I am glad to say that we have a few recruits coming on. Collectors often seem surprised that we have no book on Australian shells, but the main difficulty is that we have five distinct marine faunas in Australia , as well as Tasmanian and Barrier Reef, with New Zealand and the South Pacific on our doorstep. Tasmania was done some years ago by Tate and May and South Australia is being done very efficiently at present by Cotton and Godfrey, but New South Wales, Queensland, and Western Australia have merely been listed, and the lists are very much out of date. N.S.W. is the latest (1917) and owing to subsequent work by Hedley and Iredale, nearly half the names need revision. The only work covering all Australia is Iredale and Hull's work on the Loricates, published about ten years ago, which is excellent. We are also handicapped by lack of funds; Sydney and Adelaide are the only two museums which have a conchologist on the staff, the rest having to depend on amateur help or casual help from some other member of the staff. The Australian Museum in Sydney is the only one with a really first class conchological library, so with all these drawbacks young collectors are apt to get discouraged. Our North and North-west coast, which is mainly tropical and has a tide range up to 30 feet in many places, is a wonderful collecting ground, but has been merely scratched on the surface, as the white population is only a few thousands-- only one or two per mile of coast- settled mostly in about half a dozen twons, so there is no end of work to be done there. I am not writing any of this for publication, but started off to let you know how much I enjoy reading your " minutes", and got a bit wound up, largely owing to jealousy that we have so much to do and no energetic members like you have to do it. I very much fear that my active collecting days are done: I have been in hospital now for over two years, and even if and when I get home again, am not likely to be able to browse on the beaches in the future."

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While there is seldom anything of particular interest to a conchologist the monthly publication of the Zoological Society of San Diego, Balboa Park, San Diego called ZOONOOZ , subsc. price $1.00 per year is an interesting little paper and well worth the money to anyone interested in nature.

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William Beebe's " Book of Bays" (Harcourt Brace and Co.)(New York, 1942) is certainly not a book on conchology but it is a very interesting record of the Cruise of the Zaca. The route taken by Beebe on this trip from Southern California to Colombia and the descriptions of the places they visited may be injurious to your other affairs though because most of us will stop what we are doing and start figuring out our post war trip collecting shells along the route taken by the Zaca.

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The April 1 Bulletin of the Natural History Museum of San Diego is at hand with the usual interesting notes. A soldier on one of the Pacific Islands reports " This island's shores have been gleaned and cleaned of shells by G.I. Joe". In a letter from Europe comes an odd bit " One day about the time of landing in southern France, the Germans blew up a munitions dump that had been concealed in a cave and exposed some fine deposits of fossils- a number of which had never been classified before." So, in one case at least the enemy made an unwitting contribution to science.

In its " Occasional Papers" series, the Society issued on March 20 " An Annotated List of the Marine Algae and Marine Grasses of San Diego County, California", by E. Yale Dawson of the Scripps Institution of Oceanography This not only names the hundreds of kinds of sea weeds that occur on our coast, but contains directions for collecting and preserving, keys, a glossary of technical terms, bibliography and index. The price of the paper is 25¢.

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Rev. Paul D. Ford, 160 W. 20th St., Erie, Pa. Dr. Ford has some of the finest duplicate material you are likely to see. The shells are the results of several years collecting in the Bahamas. It is likely that he already has most of the common species from anywhere but if you have some really fine or rare material to exchange for the same type of material it is to your interests to write the Rev. Ford. It is not to be expected that you will be as fortunate as the editor of this paper who has received many species of the really rare kind such as the shell mentioned below " In the box that I sent, I include d one specimen of the rare little Typhis fordi Pilsbry. I believe that you are the only person on the Pacific Coast who has one of these. The reason I think that, is because you are the only one that I have ever sent it to. As far as is known there has never been but four other persons apart from the Ford family who has ever found this species, and in each case those four persons found only one specimen each. Therefore they would have none to exchange. But we have exchanged with a few other Florida collectors. If you ever hear of any one else having the shell, we should be very much interested to learn of it. A.H. Patterson, from Florida came over to the Bahamas, and worked on a government project there for two years, collecting shells at his spare time. During those two years he only found one single specimen. He is a keen collector. That gives you an idea of how scarce the shell really is.

Professor Ralph W. Dexter, Prof. of Biology, Kent State University, Kent, Ohio. " Regarding the problem of the status of your publication, I would like to make the following suggestion. Would it not be a good idea to give your paper a name and make the " Minutes of the Conchological Club of Southern California", the " Minutes of the Long Beach Shell Club" and " Notes and News" as special departments of your publication along with the articles which are included, but which are not properly minutes in themselves. In this way, you can continue to publish the same sort of material except that the paper would consist of separate departments all under a publication title rather than referring to the whole paper as " minutes".

We wish to thank Professor Dexter for his suggestion and it is no doubt good. There is but one objection to it and that is that we should have done this when we started this paper. Now our paper is being card indexed in many large museums and libraries as the " Minutes of the Conch. Club of Southern Calif." and a change in name would cause considerable trouble. The way the editor knows this is that he has often been amazed to get an urgent letter from some large institution complaining that they received an illegible page or even paragraph in some article mentioning the page and paragraph. It is, of course, gratifying to know that some persons really do read it through.

Dr. L.K. Darbaker, 424 Franklin Ave., Wilkinsburg, Pennsylvania. We wish to thank Dr. Darbaker for his generous encouragement both financially and the " Keep up the good work.".

Ralph Bormann Jr. has been transferred by the Navy from Calif. Inst. Tech. to Princeton University. Congratulations on another step up the ladder.

Members who try to read these papers will rejoice over the announcement that we have succeeded in purchasing a limited amount of decent paper. This news or whatever it is that we have been using is about as bad as we have seen. However, we are fortunate to get anything to print on in these days, and for a time it looked as if we might have to quit for want of paper.

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Dr. A.W.B. Powell, Auckland Museum, Box 27, Newmarket, Auckland, New Zealand.

" This is a belated acknowledgement of the generosity of your club for including this museum in your distribution of the Minutes. The style of these Minutes is excellent, and I wish to congratulate all concerned. This is a happy balance- the presentation of solid scientific facts with a pleasant personal touch. Keep it up.

I note in your December issue that you require addresses and particulars of members and friends. Hereare mine if required.

A.W.B. Powell, F.R.S.N.Z., Assistant Director, Auckland Museum. Interested in all Mollusca, Recent and Fossil. Especially interested in Turridae, Pulmonate land snails and animal exology. Sixty publications. Willing to exchange shells. Require smaller deep-water Californian species, Californian land snails (species and subspecies described within recent years), Lower Californian and West Mexican Mollusca and any from Californian Tertiary. Offer in exchange New Zealand Mollusca from wide range of localities- small deep water species (many of them paratypes)- land mollusca and Tertiary fossils. Subrecent land snails from Norfolk Island.

I note that your club offers to fill in gaps in the " Minutes" in respect to institutions and libraries. I have collected all our parts with the following result: we have numbers 24-27 and Nos. 36 to the present.

Does your club maintain a reference library ? Is so I would be pleased to donate a selection of my papers on Mollusca.

May be of interest to members who have duplicate copies of the Nautilus. I have the following gaps in my series: Volumes 1- 5; 6-1,2,3; 7-16; 17- 5 & 12; 18- 1-8; 19- 10,11,12; 20- 1-7 & 10-12; 21-1-4; 22- 1-6 & 8; 23-6; 34-39; 40-1 & 2; 41-43; 44-1,2,3,;45-53; 54-1 & 2.

In return I offer copies of my publications on New Zealand Shellfish, including:

1937 Discovery Reports- New Species of Marine Mollusca from New Zealand, 70 pp, 12 plates.

1937 Shellfish of New Zealand. 100 pp. 18 plates (2 in colour). Complete check-list.

1942. The New Zealand Recent and Fossil Mollusca of the Family Turridae. 192 pp, 14 plates. Monograph of N.Z. Turrids plus review of Turrid genera of the world.

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Mrs. Gray Hackney, 1333 Cornwall Place, Norfolk 8, Virginia. " Just now received my copy of the March " Minutes". Maybe it just happened to hit me right, but I thought it was one of the best that you have issued-- and they're all good. The photographic plates are fine; I'm enclosing one of my too-infrequent checks, in the hope that you may be able to continue them.

Will you thank Tom, for the very helpful suggestions on mounting radulae ? They really helped me immensely. Dr. MacFarland's letter interested me, too, for lately, I've been using glycerine exclusively. It is definitely much more satisfactory than the other mounting mediums.

Also, will you as " Tom" is he would be interested in having me send him some extracted radulae, ready to mount, of our East Coast shells? Either marine or land, or both, whichever appeals to him. I had thought of sending them in cedarwood oil, unmounted, because I know that he must be a far better technician than I, and he could do it to suit himself. If he wants them, it will be a little time until I could send very many-- but I'll be back at the beach in a very short time,and would be glad to send as many species as I could collect."

Note* There is no doubt but that Tom would like to have the radulae. He has a large collection of mounts from both coasts now. However, he is just completing his training as M.D. and is expecting to be assigned to a government hospital within the next month or two. He is in the army and obviously his time for shell affairs is limited to the occasional hour.

Dr. J. Harlan Johnson, Colorado School of Mines, Golden, Colorado. " We are enjoying the Minutes of the Conchological Club of Southern California, and appreciate receiving it. I am only too glad to send you herewuth a dollar's worth of stamps to help cover postage charges. You are doing a very nice piece of work."

Jack Schmidt,406 N. K St., Lake Worth, Florida. " I have just received the " Minutes" for March, and your letter to the members. ... But first I'd like to compliment you on the plate in this issue. It is another step forwardfor your papers." Our friend Schmidt thinks we should at least make a suggested yearly price for our papers.

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Those interested in oceanography will wish to order a copy of the latest publication " Coastal Currents Along the Atlantic Coast of the United States", Coast and Geodetic Survey Special Publication No. 230. 73 pages, 35 illustrations, 28 lithographed charts depicting the current movements.

The price if 75¢- order from The Superintendent of Documents, Govern-ment Printing Office, Washington 25, D.C.

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Occasional Papers on Mollusks, published by the Department of Mollusks, Museum of Comparative Zoology, Harvard University, Cambridge, Mass. No.1, Feb. 27,1945.

This issue is devoted to a paper by Lieutenant R.T. Abbott " A New Celebes Freshwater Snail (Hydrobiinae)". It is a well illustrated paper on the genus Indopyrgus Thiele,1928 with a description of a new species.

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Dr. W.J. Clench, Museum of Comparative Zoology, Harvard College. We are greatly flattered to have the following note in Dr. Clench's letter " We are more than anxious to complete our department files of your most excell-ent series of the Conchological Club. We have frequent use for these pub-lications.

Johnsonia 17 is well under way and if all goes well, we will mail it out in May.

Lt. Albert R. Mead, O-1546350, Hq. WASC APO 606 c/o PM Miami, Fla. " Mr. Allyn G. Smith wrote me some time ago to tell me what all has been happen-ing conchological and malacological since I left the states. In his letter he mentioned you and stated that you had copies of the Minutes of the Con-chological Club of Southern California. He also stated that a mailage fee would permit me to receive these and I just hope you know how much I would welcome some recent information in these fields. Here in Africa we are almost completely out of touch with the new things in our fields except for an occasional issue of Science which is anywheres from two to four months late. Please put me on your list and let me know what the fee is to cover all expenses involved. If you need any references I know Dr. J.A. Comstock of the Los Angeles Museum very well." Of course, we are sending the Lieutenant our papers. We have quite a stack and first class postage is quite an item on some of our heavier issues.

MINUTES OF THE LONG BEACH SHELL CLUB Meeting of April 8,1945.

Miss Julia Ellen Rogers, in the absence of the president, called the meeting to order. Eleven members and one visitor were present.

Mrs. E.P. Chace was introduced as the speaker, taking as her topic " Habits of Land Snails as Studied by Mr. and Mrs. E.P. Chace", which was illustrated by maps showing the Chaces collecting spots from San Francisco north to Aberdeen,Wash. and from there to Seattle. Specimens of beautiful shiny brown,dull green, white, and some srtiped with red brown were shown. Mrs. Chace warned against the introduced species which do not hibernate during the winter and do more harm than the Helix aspersa. She told how the vicinity of La Jolla was overrun by a European snail that may have come in with bulbs or plants, and how flame throwing and a bounty were necessary to eliminate the destructive species. Land snails may be found in warm,moist areas. Too much heat causes them to attach tightly to the host and dry and crumble. In the redwood area many are found in rotten logs, or about the tall ferns that abound there. Others climb trees. One interesting specimen shown by Mrs. Chace had showed poor choice of a resting place, for the tree pitch held it there until it died. Some species abound in nettle patches where heavy gloves and irons are used in breaking down the plants. Young specimens climb the bush while older ones attach themselves near the roots . Still other species avoid cold weather by burrowing as much as a foot underground, while a hardier kind remains above, even when snow falls. According to Mrs. Chace, there is still need for more study in many of the groups, especially Polygyra. Monadenia fidelis she says, is most varied in color, but cannot as yet offer a satisfactory reason for the variation. Her outline for five families should be of help to beginning collectors, so is added.

1. Helicidae- a European family represented by species, H. aspersa, H. pisana H. lactea, and others.
2. Hellicellidae- five species introduced locally in North America.
3. Helminthoglyptidae- widely distributed , Pacific slope north to Sitka, Florida Keys,Mexico,Central America, and the West Indies, Andes Mts. from Ecuador to western Argentina.
4. Camaenidae- A. Sub-family Creohelicinae- mostly in Rocky Mts., but coming into Southern California. B. Sub-family, Ammonitellinae- California, Montana,Idaho.
5. Polygyridae- most widely distributed of the North American family of Helices, found in all states but Wyoming,Colorado,Utah, and Nevada. Also in Alaska,Canada, and Mexico. This group is more numerous in species than any other land snail family of our own area.

After thanking Mrs. and Mr. Chace for the talk and opportunity to see specimens brought to the club, Miss Rogers adjourned the group to visit the exhibit of shells from the Zech collection, which this month is in the upper hall of the Lincoln Park Library.

Respectfully submitted,
Mary Borman, Secretary pro-tem.

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Allyn G. Smith, 722 Santa Barbara Rd., Berkeley 7, Calif. " You will be interested to know that our Monterey paper is finished and has been submitted for publication. When it will be printed I don't know yet, but I think it may have a pretty good chance of going through fairly soon."

Dr. W.A. Hilton has an interesting article in the Scientific Monthly for March entitled " The Story of a Marine Laboratory". He tells of the development of Pomona College's Laguna Beach Marine Laboratory and describes the surrounding marine setting.

Rutgers University Library, New Brunswick, New Jersey. We are pleased to ship this institution a file of all of our available back issues and place them on our mailing list for future issues.

Professor Louis Brand, University of Cincinnati, Cincinnati, Ohio. " Your check list of Pacific Pelecypoda is a very useful piece of work for which you deserve the commendation and thanks of conchologists. I have just had occasion to refer to it in connection with a species of Cardita which had me stumped; I thought it was ventricosa until I examined Tom's enlarged drawings.

If you need any cash in order to continue with your photographic reproductions why dont you make a general levy on your subscribers ? I feel sure that everyone recognizes the value of your work and will be glad to chip in.

Are you interested in a list of shells for the Minutes that my daughter collected at Arica,Chile? Although Dr. Hertlein has named several for me there are still a few that are puzzling. No deep water species are included -- all littoral material. The Chileans call the Fissurellas " lapas", the Concholepas " locos" (I have just discovered that this shell has an operculum, a sort of molluscan vermiform appendix /); and the black edible mussels are " almejas".

We will answer the last question here. To be sure we will be very happy to run a list of littoral shells collected at Arica,Chile.

Ralph B. Normann, A.S. 735-73-55 U.S.N.R. Pre Misshipmen's School, Princeton New Jersey. This Ralph's latest address.

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In our Distributional List of the Pelecypoda we listed the species Nucula exigua Sowerby,1832. The name Nucula suprastriata Arnold,1903 (ex Carpenter MS) was omited from out faunal list on the theory (fide Grant and Gale,1931), that it is in the synonymy of N. exigua. However, the name suprastriata was used by many of the early authors including Keep in early aditions, Arnold etc. Consequently many sets of specimens were given this label and are in local collections. Recently some specimens from San Pedro so labelled by Dr. Tremper were submitted to me for study. They are of course, identical with the shells we classify as N. exigua Sowerby. Dr . A. Myra Keen of Stanford University has given us a statement on this matter (Per. Comm. April,1945) " Nucula (Nucula) suprastriata Arnold,1903 (ex Carpenter MS), was described from the Pleistocene of San Pedro, and as yet we have seen no valid Recent specimens. The principal difference between this and exigua is size. The average length of exigua is 4.6 mm., of suprastriata 5.8 mm. No specimens of exigua that we have seen are longer than 5.2 mm., while suprastriata may attain a length of 7.0 mm."

Nucula bellotii A. Adams. In Minutes # 33, p. 8 we discussed this species. Some southern Calif. specimens have been so classified in error. The following statement by Dr. A.M. Keen is if value on this species." Nucula(Ennucula) bellotii A. Adams,1856, is the first available name for N. inflata Hancock, 1846, preoccupied, and N. expansa Reeve,1855, also preoccupied. The type locality is " Arctic seas", where it seems to be widely distributed. A figure of expansa is given by Mrs. Oldroyd(vol.1,1924,pl.13, figs.6-7). The holotype is figured by Schenck in 1939. The species N. quirica Dall seems to be a synonym; at least, all of the characters mentioned by Dall as diagnostic fall within the range of variation of N. bellotii."

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ADDITIONS AND CORRECTIONS

Minutes #43 and #45 p 17- Macoma yoldiformis Carpenter,1864. Reported from Hinchinbrook Island, Alaska, dredged on muddy bottom (Norberg) (W.J. Eyerdam). This is an extension of range northward.

Minutes #45 p 19- Mya japonica Jay,1857. Mr. W.J. Eyerdam has called attention to the fact that we omited the geographic range in our list for this species. The range is according to Grant and Gale " Arctic Ocean to Japan and Monterey, Calif.: probably also Atlantic".

Minutes #45, p. 19. Panomya turgida Dall,1916. We published the range as Unalaska to Schumagin Islands. Mr. W.J. Eyerdam reported the species from a sandy beach on Sitkalidak Island, Alaska,1931 which is an extension of range of about 200 miles northeast.

Minutes #42 p 20 and # 45 p 16- Cooperella subdiaphana (Carpenter),1864

Mr. A.M. Strong told at a recent meeting of the club of having collected this species in Alamitos Bay. They were of a decided pink colot leading him to think at first sight that he had something different. The solution was that they were spawning which gave them this color.

Minutes #44, pp 3-35. In this issue we discussed the family Mactridae . The following comments were received after our paper came out. It is from Allyn G. Smith " Spisula hemphilli ranges as far north as Monterey as there is a single valve in the Gordon collection that is unquestionably this species. It looks to Hertlein and me that M. nasuta is a rare species that you might find occasionally in Southern California; also M. dolabriformis , which definitely does not occur at Monterey and probably is more likely a Lower Californian species. I have two good specimens of planulata from Puget Sound, which are larger than some I collected at San Pedro years ago." The information in this note means extensions of our published ranges for two species as follows:

Minutes #45 p 18- Spisula hemphilli (Dall),1894. Our range is to be extended northward to Monterey, Calif. (A.G. Smith). and

Spisula planulata (Conrad),1837. Our range is extended northward from Monterey to Puget Sound (A.G. Smith).

Minutes # 43 p 20- Donax californica Conrad,1837. Additional records: Corinto, Nicauragua,1938 & 1939 on sandy beach (W.J. Eyerdam); slough at Imperial Beach; San Diego Bay; Magdalena Bay (San Diego Museum Nat . H.

Min. #43-p 20- Donax gouldii Dall- Los Coronados Islands,Coronado Beach, Ocean Beach, La Jolla (Miss V. Bristol).

Min. #43 p 21- Donax punctatostriatus Hanley- Supe, Peru,1938 & 1939,on sandy beach (W.J. Eyerdam); Acapulco, Mazatlan,Manzanillo,Mex., Kino Bay, Tres Marias Islands (H.N. Lowe).

Min. #43 p 21- Donax conradi Deshayes,1854. Ensenada, Lower Calif.(Lowe).

Min.#42 p 20 and #45 p 16- Cooperella subdiaphana (Carpenter)- San Felipe, L.C., Newport Bay, Alamitos Bay (H.N. Lowe); Mission Bay(Orjala).

Min. # 43 p 21- Gari californica (Conrad),1848. Bainbridge Island, Kitsap Co., Wash., 1944 (W.J. Eyerdam); San Diego Bay, San Pedro, San Onofre, Puget Sound, Sitka,Alaska (Miss V. Bristol); common in Mission Bay(Emerson

Min.#43 p 21- Gari regularis Carpenter,1864. One specimen from 25 fms . Catalina Island (H.N. Lowe).

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA
May 1945

NOTE

We wish to express our sincere appreciation for the generous contributions of many of our correspondents, and the following statement is not intended for them. However, we have reluctantly arrived at the conclusion that there should be some minimum assessment on those wishing to receive our papers. There is reason to believe that some of our large mailing list are but casually interested.

Therefore, it seems reasonable to suggest that $2.50 should be the minimum amount expected annualy or $1.25 each six months. The next issue will be sent only to those from whom we hear.

We expect soon to start our coverage of the freshwater fauna, and in addition to this we have several special papers to publish. In the preparation of photographic plates and other material a much smaller mailing list will be welcome.

It is not our intention to offer subscriptions and guarantee regular periodical publication. These papers are published by a group of interested students for our own pleasure, and we do not wish them to become a burden or an obligation, We all look forward to the days when we will again be able to arrange extensive collecting trips, dredging excursions etc., and we have no desire to be worried about getting out a paper if we happen to be enjoying a few winter months in Guaymas or Mazatlan.

John Q. Burch, Editor
4206 Halldale Ave.,
Los Angeles 37, Calif.

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We still have on hand a few copies of our Distributional List Part I, Pelecypoda for which we are asking $5.00 to our fund.

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The next meeting will be held June 3, at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. at 2:30 P.M.

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" Mollusca", Volume 1, Number 4, April 10,1945, published by Paul H. Reed, Box 267, Tavares, Florida.

This issue is one of which Mr. Reed should be very proud. Dr. W.J. Clench described a new subspecies of Oliva- O. reticularis pattersoni with the figures being used as the front plate. Anne Gray Hackney has a very fine and illustrated paper on " The Radula of Mollusks", other fine papers are by Paul D. Ford and Dr. T. Van Hyning.

Mollusca is well worth the $2.50 yearly subscription and if you are not getting it you are missing something.

Family VESICIDAE

Genus *Vesica* Swainson,1840. Type (by subsequent designation, Gray, 1847), *Bulla ampulla* Linnaeus.

This is the family known from many authors as Bullidae,Bullariidae, and the genera *Bulla*,*Bullaria*. The explanation of the necessity for this change in nomenclature is taken care of in Minutes #47, pp 20,21.

" Shell oval or ovate, compactly involute, generally solid and with a mottled cloour-pattern; spire sunken, umbilicated; aperture as high as the shell, rising slightly above the vertex, its upper portion narrow,expanded toward the base; lip simple, flecuous; columella short and concave, with a crescentic white reflexed callus; parietal wall smooth, with a light callus"

Vesica gouldiana (Pilsbry),1893. Santa Barbara, Calif. to Mazatlan,Mexico . Type locality not stated in the original description but stated by Mrs. Oldroyd to be Guaymas, Mexico. This species was known to early authors as *Bulla nebulosa* Gould,1850.

Collecting data: This large species is our common species found in all sloughs and bays. It has a characteristic mottled coloration and is microscopically granulose, Our experience has been to find it seasonally very abundant, usually in the greatest numbers in May,June and July, in Mugu Bay, Ventura Co., Anaheim Bay, Alamitos Bay, Newport Bay, Estero below Ensenada, etc. In Mugu Bay it is found in great numbers just beneath the surface of the mud and around the eel grass. The bathymetric range of this species is os some interest. It is not confined to the bays and we have dredged it in water as deep as 25 fms. off Catalina Island.(Burch); common in Mission Bay (W.K. Emerson); Glorietta Bay, Coronado (Bristol); San Diego Bay near National City (Brown); San Diego Bay (Hemphill); Catalina Island, Calif. Alamitos Bay,Tepoca Bay off Tiburon Island, Gulf of Calif., Kino Bay,Sonora, Pta. Penasco,Guaymas,Pts. Libertad,Sonora, Angeles Bay, Gulf of Calif. (H.N . Lowe); Magdalena Bay, Lower Calif. (Lowe and Harrison);

Vesica punctulata (A. Adams),1850. " Gulf of California to Lobos Islands, Peru" (Dall,1910). This species is not of our Recent fauna but has been reported in error from California in a number of lists. Mr. George Willett notes " Common in some of our late Pleistocene deposits, but not seen living north of Ensenada." While this is a very distinct species with a much less obese body whorl, it could possibly be carelessly confused with the above species. A discussion of this species is given by Grant and Gale,1931, p.456. There is no description of this species in Oldroyd. The species is reported by H.N. Lowe from the following Mexican localities: La Paz, Mazatlan, Tres Marias Islands, Manzanillo, Acapulco, San Juan del Sur, Taboga Island,Montijo Bay.

Vesica quoyana (Dall),1919. (new name for " *Bulla quoyii* Gray" of A. Adams) Catalina Island, Calif. to Acapulco, Mexico (Dall). Dr. A. Myra Keen (Per. Comm. March,1945) states " Figures cited in USNM Bull. 112 are of *punctulata* The correct citation should be, Thes Conch., vol. 2, pl. 123, fig.71, 1850; Manual Conch., vol. 15, pl.34, fig.9. Type locality, Galapagos, fide Adams. Either this is incorrect or Dall's stated range to Acapulco, Mexico is incomplete."

Mr. A.M. Strong (Per. Comm. March,1945) clearly states the problems involved in the study of this species as follows:

Bulla quoyii A. Adams in Sowerby, Thes. Conch. vol.2,1850,p.123,pl.123,f. 71.

Bulla quoyii Gray in Carpenter, Mazatlan Cat., p. 173 and Smith. Misc. Coll., p. 132.

Bulla quoyii Gray in Reeve and Tryon.

Not Bulla quoyii Gray MS in Diaffenbeck,1842.

Diaffenbeck stated that Gray's MS shell came from New Zealand. Carpenter states (Smith. Misc. Coll. p.5) that many of his localities were in error and that Bulla quoyii probably came from the west coast. If so it is a valid name for the west coast.

Carpenter gave the same reference to page and figure in Thes. Conch. as Dall for Bulla quoyii but gives the authority as Gray, not A. Adams as does Reeve and Tryon. Which is correct ?

In any case Dall apparently considered that the Gulf and California shell that Carpenter identifies as Bulla quoyii is not the same as that given by Diaffenbeck and gives it a new name, Bulla quoyana.

I know of no records of it having been found except those of Dall and Carpenter tho it has been reported fossil by Jordan from Magdalena Bay. The descriptions and figures in Reeve and Tryon as of the Galapagos shell as stated and may not be the same as the Gulf shell identified by Carpenter.

This is badly mixed up. However, I think the answer would be that if Bulla quoyii has been recognized by later collectors from New Zealand, it will have to be restricted to that fauna. If it is not reported from there it will have to be used for the Galapagan shell. If this is the same as the Gulf shell Dall's new name, quoyana, was not needed. If the Gulf shell is distinct from the Galapagan shell Bulla quoyana Dall can be used and range given as Gulf of California to Catalina Island."

The original description of Adams in Latin is given in Mrs. Oldroyd's work, Vol.II, Part I, p.41 and also Sowerby's description. The following additional references from Sowerby may be of interest to those following up a study of these confusing species."Bulla quoyii (pl. cxxiii. f. 71), Gray, MS, Brit. Mus. Sowerby, G.B. Jr. Thes. Conch. 1855, p. 576-577, sp. 48." " Galapagos Islands; coral sand, 6-8 fatgoms,. Cuming.Mus.Cuming"

Mr. George Willett calls attention to the following " According to Tryon, Bulla quoyii A. Adams is a synonym of B. punctulata A. Adams."

There is a general feeling of uncertainty about what this species really is. Miss Viola Bristol of the San Diego Museum reports that she has taken it at La Playa, Pt. Loma, Calif. and also that it was taken in San Diego Bay by Hemphill. It will be interesting to study these specimens.

Family AKERIDAE

Genus Haminoea Turton and Kingston in Carrington,1830. Type (by monotypy) Bulla hydatis Linne.

" Shell thin and rather fragile, unicolored, corneous, yellowish or greenish, covered with a thin cuticle, globose, ovate, or cylindric-oval, the spire sunken and concealed, vertex concave, imperforate or minutely perforate; body-whorl large; aperture as long as the shell, broadly rounded below, narrow above; columella simply concave, thin, its edge narrowly reflexed, showing a slight fold where it joins the body of the shell; lip retreating above, but not distinctly sinused. "

Mr. A.M. Strong (Per. Comm. March,1945) gives a clear statement of some of the problems involved in a study of this genus.

" Carpenter reported a Haminoea hydratis Linnaeus from Vancouver in Smith. Misc. Coll. pp 89,132 and stated " Exactly accordes with the European specimens". This is almost certainly the shell described as Haminoea olgae Dall,1919. This is a northern shell only differing from Haminoea vesicula Gould by small differences in the shape of the aperture. The south-

-thern records are probably not correct, The Gulf of California shell is Haminoea angelensis Baker and Hanna which ban ohly be separated from Haminoea vesicula Gould by a careful examination of specimens.

Carpenter describes Haminoea cymbiformis in Mazatlan Cat., p. 174, from " Only one rather imperfect specimen". It measured approximately 1.75 by 1.25 mm. and could have been the very young of several different things . The name should probably be placed in the indeterminate list.

Haminoea virescens Sowerby may be valid for our small shell, depending on whether or not a shell answering this description can be found at Pitcairn Island. Our shell has been named Haminoea dalli Bartsch.(T.S. Oldroyd, Proc. U.S.N.M., vol.65,Art.22, p.9,1925). Again I question the Mexico record. The Gulf of California shell is Haminoea strongi Baker and Hanna, which was long confused with Haminoea virescens Sowerby. Bartsch also described a var. excolpa which is a bay form, nearly white with a thin epidermis."

Haminoea virescens(Sowerby), 1833. Puget Sound to Puerto Libertad,Mexico . Type locality, Pitcairn Island, southwestern Pacific (?).

The name H. cymbiformis Carpenter is proposed by Grant and Gale,1931 to replace in our fauna the name H. virescens Sowerby . The name virescens is attacked because the type locality is Pitcairn Island which sounds fantastic, but if our shell is the same as the Pitcairn Island shell then obviously the correct name is virescens. Dr. A. Myra Keen asvises " H. virescens is probably the correct name. See Tomlin, Nautilus vol.47, no.1, p. 37. Pitcairn Island may well be an erroneous location. Mr. George Willett notes " I would use virescens, at least for now." Dr. Pilsbry wrotean article in thw Nautilus 1933, vol. 46, pp 140-141 in which this problem is fully discussed. Dr. Pilsbry favors the use of virescens.

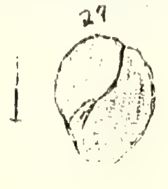
In the synonymy of this species is usually placed Haminoea virescens rosacea Spicer described in Nautilus vol. 47, pp 52,53,54. Pink specimens are not uncommon. The variety rosacea was described from San Diego.

Collecting data: For such a fragile shell this species is common in the rocky rubble. We have taken it all along the coast of southern California in the tide pools and among the rocks in the most exposed locations . However, we have also taken it in protected lagoons such as Mugu, Newport Bay etc. While we did pick up a few in our dredges off Santa Monica that came from very shallow water, not to exceed 5 to 10 fms. We have never seen the genus from deeper water. (Burch) ; Mission Bay, common (W.K. Emerson); San Diego Bay (Bristol); Ocean Beach (Baker); La Jolla (Bristol).

Haminoea vesicula (Gould),1855. Southeastern Alaska to the Gulf of California, Mexico. Type locality, San Diego, Calif. Ketchikan, Alaska (Willett) is the most northern record we have. Figured in Man. Conch. vol.15,pl.4,f.28

This species is easily distinguished from virescens by the aperture and the fact that it is not constricted at the apex.

Collecting data: In our experience this is a bay form, much more fragile than the above species. We have taken it in great numbers in the lagoon at Mugu,Playa del Rey,Anaheim Bay,Alamitos Bay etc. (Burch); Elkhorn Slough seasonably abundant (A. Smith); Mission Bay, uncommon (W.K. Emerson); Big Spookum Inlet, Puget Sound, Mason Co., Wash. (W.J. Eyerdam); Imperial Beach (Banks); Magdalena Bay (Orcutt); San Diego Bay (Bristol);Santa Barbara (Orcutt); Orcus Island, P.S. (Dr. Baker)



Tracing of original figure of Haminoea vesicula

Haminoea olgae Dall,1919. Drier Bay, Knight Island,Alaska (Eyerdam) to San Quentin Bay, Lower California (Dall). Type locality, Peavine Pass, Olga,Orcas Island, Washington.

The figure of this species in Oldroyd is rather unsatisfactory and the validity of the species has been a source of a great deal of discussion. Dr. Dall in his description stated that it is a close relative of H. vesicula Gould. It has certainly been rather generally confused with vesicula if it is not in fact identical with it. Mr. George Willett advises (Per. Comm. April,1945) " I have a set from Olga,Wash. named olgae by Engberg. I can not differentiate them from vesicula. I doubt the validity of olgae."

Collecting data: Among roots of eel grass in mud- Drier Bay, Knight Island, Alaska collected by W.J. Eyerdam and identified by Dr. W.H. Dall. Dall named this shell after specimens collected by Dr. Engberg at Olga,Wash." Orcas Island (Oldroyd); Elkhorn Slough,Monterey Co. (Spicer).

Family PHILINIDAE

Genus Philine Ascanius,1772. Type (by monotypy), P. quadripartita Ascanius) -- Bulla aperta Linne).

Shell capable of containing but a small part of the body, entirely internal,covered by the reflexed and united mantle; whitish,fragile, consisting of 1 or 2 whorls; spire sunken or absent; aperture extremely large, the outer lip often produced in a lobe or point above." Suter.

Philine sinuata Stimpson,1850. Port Clarence,Bering Strait (Krause) (Dall) Also Atlantic. Johnson gives the range Maine to Massachusetts 4-7 fms. Type locality, Broad Bay, Boston Harbor.

Philine polaris Aurivillius, 1885. Arctic Sea to Nanaimo, British Columbia. Type Locality, 73 5 N, 144 20 E and 70 28 N., 164 10 E in 8-9 fms.

Philine bakeri Dall,1919. Off South Coronado Island near San Diego,Calif.

Philine californica Willett,1944. Southern California Academy of Science Bulletin, vol. 43, part 2, pp 71-73. Type locality off Redondo Beach, Calif. in 50 fms. The original description follows:

" Shell of two or more whorls, oval, inflated,slightly contracted below the apex; spire sunken, concealed, only the extreme tip being visible. Aperture very large, oval, contracted above; outer lip extended slightly above the apex and curved down to join the body whorl; inner lip thin, twisted, and flattened where it joins the body whorl in front of a minute umbilical groove. Sculpture of fine, close, rather regudarly-spaced axial striae, crossed by fine, irregularly-spaced spiral striae,forming a laticed sculpture; on the upper part of the shell there are minute tubercles at the intersections of the striae. Color dull white, with a broad, light-brown band slightly above the middle.

A rather poor photograph of the living specimen shows that the animal is much too large to be contained in the shell, the head, disc, foot and mantle being outside.

The unique type, No. 1074 Los Angeles County Museum, was collected by John Q. and Tom Burch off Redondo, California, in 50 fathoms. The type measures: alt. 5.5, lat. 3.6 mm. (lip not entire).

The latticed sculpture of this little shell would place it in the Section Laona A. Adams, not previously reported from the Pacific coast of America.

Family GASTROPTERIDAE

Genus Gastropteron Kosse,1813. Type (by monotypy): G. meckeli Blainville,1825 (= Sarcopterus ruber Rafinesque,1814). (Fide Sherborn and others. Evidently the genotype was described by Kosse but not given a specific name. The first species assigned to Kosse's genus becomes the type, but in this case happens to be a synonym of a name proposed earlier by Rafinesque. The genotype, therefore, is Gastropteron rubrum (Rafinesque).

We are indebted to Dr. A. Myra Keen for the information on this genus. " Shell wholly covered, consisting of a minute nautiloid, calcareous spire and a large open last whorl of very delicate membrane or cuticle. Gastropteron swims rapidly by means of its large parapodial lobes, which are used as wings" (Tryon & Pilsbry, Man. of Conchology).

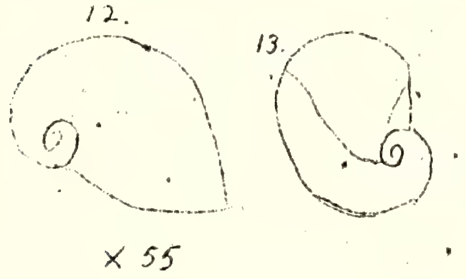
Gastropteron pacificum Bergh,1893. Aleutian Islands to Fuca Strait.(Dall) Type locality, Unalaska, Aleutian Islands (fide Oldroyd, p. 46) Range to Monterey Bay; rare (MacFarland) (A.G. Smith).

Gastropteron cinereum Dall,1925. Queen Charlotte Islands to Vancouver Island, British Columbia. Type locality, Skidegate Inlet, Queen Charlotte Islands, British Columbia. Described in Rept. Canadian Arctic Exped. 1913-18, vol.8, pt. B, p. 11B, text fig.4. (tracing given below).

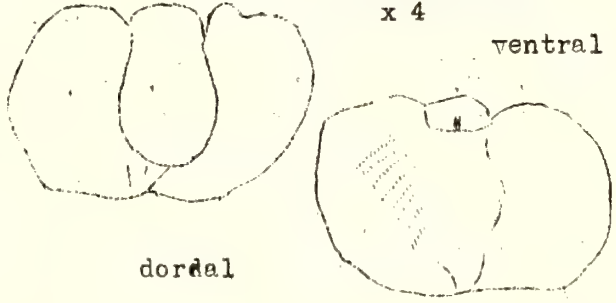
The description of this species is given by Oldroyd, p. 46 except for the following notes-

1. " Skidegate inlet, Queen Charlotte Islands, British Columbia, July,1910, W. Spreadborough, collector. Victoria Memorial Museum, Mollusks, no. 3177; cotype, presented to U.S. National Museum.
2. West side of Vancouver Island, Ucluelet, British Columbia at low tide, C.H. Young and W. Spreadborough, May,1919. Cotype, Victoria Mem. Mus. Ottawa, Cat. Mollusks, no. 3176. (Fig.4), drawn from alcoholic specimen.. The lack of lateral symmetry is probably due to contraction in the preservative.."

Below are tracings of the original figure (Zool. Jahrb. 1893, pl.16, fig.28; pl.17, figs. 10-26), figs. 12 and 13 being the only ones of the shell. Note magnification (x 55).



G. pacificum



G. cinereum
x 4

Family AGLAJIDAE

Genus Aglaja as spelled by most authors and in almost general use. However, we are advised by Dr. A. Myra Keen " Aglaia Renier,1804 seems to be the original spelling, fide Sherborn. Therefore we will spell it,

Genus Aglaia Renier,1804. Type Doridium membranaceum Meckel.

The shell of this entire family is wholly internal and generally of a minute spire with a single whorl; sometimes membraneous, sometimes partly calcified.

Aglaia purpurea Bergh,1894. Catalina Island, Calif.
Aglaia diomedia Bergh,1894. Shumagin and Kodiak Islands, Alaska.
Aglaia ocelligera Bergh,1894. Sitka Harbor, Alaska.
Aglaia adellae Dall,1894. Eagle Harbor, Puget Sound in 20 fms.

Collecting data: In the course of our dredging operations we picked up a considerable number of these animals. They are no doubt at this time in preservative in the Hancock Foundation waiting for some one to classify them. We knew that we dredged several different species but no one of our acquaintance was interested in them and neither were we. (Burch).

Genus Navanax Pilsbry,1895. Type Navanax inermis(Cooper).
" Body elongated, similar in general character to Aglaja, but anterior angles of head-shield produced to form involute rhinophores. Shell as in Aglaja." (Pilsbry).

Navanax inermis (Cooper),1862. Elkhorn Slough,Monterey Co., Calif. (Mac Ginitie) to Estero, Ensenada,Mexico (Burch). Type locality, San Diego Bay.
Collecting data: This is our common California striped slug found in all bays and sloughs. It is really a beautiful animal. It is seasonably very abundant. We have seen them literally by the thousands in the slough at Mugu, Ventura Co., Calif. and all as full of Haminoea as they could be and not burst. They do have a very thin membraneous shell but it is a safe wager that you will carve up a lot of them before you find it unless you know ehere to look. (Burch).

Family TETHYIDAE

The family name APLYSIIDAE has been in general use by most authors. However, we are advised by Dr. A. Myra Keen (Per. Comm. April,1945) " Family TETHYIDAE is preferable. As Pilsbry shows (Proc. Acad. Nat. Sci. Philadelphia, vol. 47,1895, pp. 347-350), Aplysia Linnaeus,1767, is at most only subgenerically distinct from Tethys Linnaeus,1758. The genotype of Tethys, fide Pilsbry, is T. leporina Linnaeus.".

Genus Tethys Linnaeus,1758.
" Shell very thin,membranous with a thin calcareous inner layer,nearly as large as mantle, concave, with pointed, small apex, bearing a recurved lamina, and having a concave posterior sinus." (Tryon & Pilsbry, Man. Conch.

Subgenus Neaplysia Cooper,1863. Proc. Calif. Acad. Sci. vol.3,Sept. 1863, p. 57.
" Form and external appearance as usual in the genus. Length fifteen inches, breadth five, height about the same. Color pale gray or greenish, becoming purplish at the side, folds of mantle with scattered white specks, from which an irregular network of brown lines extends over the rest of the body, interspaced with large brown blotches. Inner surface of mantle varied with alternating painted bars of white and dark brown interlocking together. Sole of foot black. Eyes very minute and black.

Shell contained in the substance of the mantle, cartilaginous, translucent, trapezoidal or hatchet-shaped, margins rounded, slightly convex above,the nucleus or center in old specimens distant from the posterior end or apex. Faint radiating lines diverging from the nucleus, crossed by an irregular network of darker lines, all ending abruptly at some distance from the margin, which has thus a wide, nearly transparent border. An accessory plate arises on the inner surface from the nucleus, spatulate in form and slightly raised.

The two younger specimens have the clear border and accessory plate less developed, and very young ones do not probably show these characters at all, but resemble the typical Aplysia in the form of the shell. On this general account I am unwilling to constitute it a new genus, but propose to call it a subgenus and the name of Neaplysia." (Cooper).

Tethys californica Cooper,1863. Monterey, Calif. to Punta Banda,Todos Santos Bay, Mexico (Burch). Type locality, San Pedro, Calif.

Collecting data: This is our common ' Sea Hare'. It frequents rocky shores . The shell may be removed from these rather easily. It is merely a thin corneous plate. It is seasonably abundant in such localities as Point Firmin,Palos Verdes, Balboa, Laguna Beach etc. (Burch); shore to 5 fathoms on kelp off Monterey, Calif. (A.G. Smith); Elkhorn Slough, Monterey Co. (MacGinitie); San Pedro and Morro Bay (H.N. Lowe).

It is likely that there will untimately be a number of subspecies described. In Nautilus 21, p.34,1907, Dr. S.S. Berry mentions a new variety but does not name it. It came from 12 fathoms off Monterey. In Nautilus 29:84 T.D.A. Cockerell discusses a species.

Tethys ritteri Cockerell,1901. San Pedro to La Jolla, Calif.

The La Jolla extension is based on Professor Cockerell's article in Nautilus 29. There may be two or more species around San Pedro but it requires careful studyand perhaps dissection to distinguish them. The only record we have other than the origihal references is that of H.N. Lowe who lists it from San Pedro.

Family TYLODINIDAE

Genus Tylodina Rafinesque,1819. Dr. A. Myra Keen advises (Per. Comm. April,1945) " The type of Tylodina is T. punctulata Rafinesque,1819 by monotypy. This is thought to be the same as the usually cited type T. citrina Joannis,1834."

This genus is placed under family UMBRACULIDAE by many authors. "Shell limpet like,depressed,apex-subcentral,with a minute spiral nucleus."

Tylodina fungina Gabb,1865. San Luis Obispo Co., Calif. (Burch) to Todos Santos Bay, Lower California (Chace). Type locality, Santa Barbara Island, Calif.

Collecting data: This species is only found in our experience associa-ted with a certain type of reddish yellow sponge. The extension of the range northward to San Luis Obispo Co. is interesting because I found these specimens of Tylodina on the typical sponge but the sponge was growing on the back of a large Haliotis rufescens Swainson brought into the market at Morro Bay. The divers told me that they had taken the Haliotis up north of Cayucos. We have taken the species along the Palos Verdes, Los Angeles County, and at Laguna Beach. (Burch); Mr. and Mrs. E.P. Chace took it at Punta Banda, Todos Santos Bay, Lower Calif., Mexico which is an extension of range in the other direction. Other records: Point Loma, San Diego Co , (Dr. Fred Baker); Laguna Beach (H.N. Lowe); La Jolla (Wilson & Fork)

Family PLEUROBRANCHIDAE

Genus Pleurobranchus Cuvier,1804. Type (by monotypy),P. peronii Cuvier

The generic descriptions are largely devoted to a detailed observation of the characters of the animal. The shell is internal, haliotiform, with a posterior subspiral nucleus.

Pleurobranchus californicus Dall,1900. Crescent City, Calif. (Chace) to San Diego, Calif. Type locality, San Pedro, Calif.

We had an interesting affair with this genus in our Minutes #37, p.17

in which we figure and describe some shells taken by Mr. and Mrs. E.P. Chace from Crescent City, Calif. We gave it the name chacei , but Dr. F.M. MacFarland wrote an opinion for us which is to be found in our Minutes #39, p.29 advising us that the Chace shells are in his opinion californica. In any event this is a vast entension of range from San Pedro the former northern limit. Dr. MacFarland advised that he will shortly publish a description of another species of this genus from our fauna.

Pleurobranchus digueti Rochebrune,1895. San Pedro, Calif. to the Gulf of California (Dall). Type locality, Mogote, baie de la Paz.

Dr. Dall was evidently confused about this species because in Bulletin 112 on p. 65 he gives it as above under Pleurobranchus, but on p. 166 under Lamellaria digueti Rochebrune etc. he gives the same reference to page and figure.

Dr. F.M. MacFarland states " P. digueti appears in many lists from southern California. I have studied it in detail in specimens from the Gulf of California, but have no reliable records from more northern points."

However, we have the following statement from Mr. A.M. Strong (Per. Comm. April,1945) " Captain White and I collected a dozen or more specimens of what I believe to be Pleurobranchus digueti Rochebrune from White's Point, near San Pedro. The shell is quite different from that collected at Crescent City by the Chaces."

Order NUDIBRANCHIATA

A discussion of the species and groups under this order will be omitted pending the publication of a monograph by Dr. F.M. MacFarland.

Order PULMONATA

Family ELLOBIIDAE

Genus Phytia Gray,1821. Dr. A. Myra Keen advises us on this genus as follows (. Per. Comm. April,1945) " The type of Phytia Gray,1821 is Voluta denticulata Montagu, by monotypy. Some authors use the generic name Alexia Gray,1847, apparently because of Sherborn's statement that Phytia is an error for Pythia. However, there is no evidence for the latter interpretation in the original paper of Gray, which I have examined carefully. Anyway, Alexia is preoccupied. In Britain two subspecies of Phytias are recognized. The marine form is called Phytia myosotis denticulata (Montagu) 1803, and the brackish water form is P. myosotis myosotis (Draparnaud),1801."

" Shell oblong-oval, thin, spire acuminate; last whorl large,rounded at base; columella with an oblique plait; aperture contracted by teeth, and sometimes by a callosity of the outer lip." (Tryon & Pilsbry, Man. Conch .)

In the way of some of the discussion in regard to the generic name the following note from A.G. Smith is of interest " I have nothing to offer on Phytia vs. Alexia , except to complicate the situation by calling attention to the fact that Hans Schlesch of Copenhagen uses the genus Myosotella Monterosato,1906 (Revidiertes Verzeichnis der danischen Land -und Susswasser-mollusken mit ihrer Verbreitung- Archiv fur Molluskenkunde,66, 1934, Seite 280).

Phytia setifer Cooper,1872. Puget Sound to Terminal Island, Calif. Type locality, Mission Creek, San Francisco.

The question of whether the above specific name is valid or in the synonymy of P. myosotis Drap. has been a matter of debate with local collectors. Dr. G. Dallas Hanna in Bulletin, Dept. of Sgric.,State of Calif., vol.28, no.5, p. 308, May,1939 discusses the problem in his paper on "Exotic Mollusca in California". Dr. Hanna figures the species on Plate B, fig.2 and is evidently of the opinion that setifer is conspecific with myosotis

Dr. W.O. Gregg of our club is making a study of this problem and will no doubt report his findings shortly.

Collecting data: My only experience and the only locality I knew for this species is exactly where the huge Cal Ship ways are today on Terminal Island. However, the species was so exceedingly abundant that it is doubtful if it could have been killed out. It could be found so far from the water on the flats that it seemed more like a land shell. The easiest way to get all you could ever use in a minute or so was to take a wist broom and pick up any old board or stone and brush them off. The only difficulty then was that you would find a nice job separating the thousands of young *Phytia* and the *Syncera translucens* Carpenter. (Burch); Elkhorn Slough, under *Salicornia* , abundant (Hanna); " I am using Cooper's name until we can be certain that *setifer* is conspecific with *myosotis*, based on a comparison of West Coast specimens with those from Europe. I have a suspicion that this shell is an introduced species on the evidence that it has been reported so far only from ports frequently visited by sailing ships in the early days." (A.G. Smith); Clallam Bay, Clallam Co., Wash., Coupeville, Whidley Island, Island Co., Wash., Manitou Beach, Kitsap Co., Wash. (W.J. Eyerdam); Humboldt Bay (Kelsey); Humboldt Bay (Chace); San Francisco (Orcutt); Newark Creek, Alameda Co.,Calif. (Dr. Greig); San Pedro (Chace)

Phytia reflexilabris (d'Orbigny),1840. Ecador to Chile.

Genus Pedipes Scopoli,1777. Type, Pedipes afer Gmelin. (fide Oldroyd)
" Shell imperforate, oval-subglobose, solid, spirally striate,whorls few, the last very large; aperture much contracted by teeth; columellar lip with usually three dentiform plications, of which the posterior one is largest and spiral; outer lip sharp, callous or dentate within."

Pedipes unisculatus Cooper,1866. Malaga Cove, Santa Monica Bay,Calif. (Burch) to Gulf of California. Type locality, San Pedro, Calif.

Collecting data: Our experience has been to find this species on all occasions in about the same habitat. An example of this is the rocky rubble below the Palos Verdes Club House. To find this species in greatest abundance climp up at least ten feet above the high tide line to a position reached only by spray. Then it is necessary to dig a hole in the rocky rubble. At a depth of 1 to 2 feet you will find Pedipes in great numbers and associated with Truncatella stimpsoni Stearns. An accompanying condition of the habitat seems to be that the rocks be packed with dead eel grass and algae. It might be mentioned that this habitat is a favorite of several other species including Fartulum orcutti Dall which may be found on careful examination in vast numbers on and in the algae and eel grass. As I recall it took me several hours to collect a large cigar box full of each of the above species which is ample to give a large set to probably every shell collector on earth. Collecting date 8/28/33 (Burch). Also taken below La Jolla, Calif. 5/1936; and Punta Banda, Lower Calif. Mexico 12/1937. The collecting dates indicate that the habitat of these species is not deasonal but they are there the year around.(Burch). Pacific Beach (Kelseyand Stephens); Santo Domingo, Lower Calif. (Orcutt); San Diego (Gripp and Hemphill); La Jolla (H.N. Lowe).

Pedipes liratus Binney,1860. San Diego, Calif. to Gulf of California. Type locality, Cape San Lucas, Lower Calif., Mexico.

Collecting data: Punta Banda, Todos Santos Bay, Lower Calif. (Chace); San Diego, Calif. (H.N. Lowe).

Pedipes angulatus C.B. Adams,1852. (Panama) Albemarle Id.,Galapagos.

This species is not of our fauna but seems to be the only other species described from this coast.

Genus Melampus Montfort,1810. Type (by original desig.), Bulimus coniformis Bruguiere = Bulla coffea Linnaeus. (fide Grant & Gale, p 461).
" Shell ovate-conic; spire low; aperture somewhat elongate, gently rounded below; inner lip polished, but not incrusted, bearing plications; outer lip generally thin, simple, sometimes bearing within lirations or a row of denticulations; umbilicus closed or a mere chink; no developed anterior canal nor posterior notch; sculpture absent or reduced to growth lines. Size generally small, averaging for genus about 12 or 15 mm."

Melampus olivaceus Carpenter,1857. Monterey Bay (Salinas River), Calif. to Mazatlan, Mexico (Dall). Type locality, Mazatlan, Mexico.

There seems to be a question about the northern limit of the range as stated by Mr. A.G. Smith as follows " Reported from the mouth of the Salinas River by Dall, although no one has reported it from the Monterey region since. This record needs confirming."

Collecting data: This species is usually labelled as having been collected in bays, sloughs, lagoons etc., but this is not strictly accurate because the habitat is up on the mud flats, and as a rule consider-

-ably higher even than the favorite condition for Cerithidea. A typical situation where this species may be taken in any quantity required is the salt marsh in back of Anaheim Bay. It is interesting that they apparently crawl up the stalks of the salt weed growing up almost along the side of the highway. I have picked them off the vegetation in places that reminded me a great deal more of collecting land shells then marine species. It is a very common species in such habitats on Terminal Island, Mission Bay, San Diego Bay (very abundant on the inner bank of the strand), and all a round the upper banks of the Estero below Ensenada, Mexico.(Burch); Kino Bay, Sonora; San Jose Island, Gulf of Calif. (H.N. Lowe); Ocean Beach, Calif. (Bristol); Newport, Calif. (Stephens); Alamitos Bay (Lowe) San Diego Bay (W.K. Emerson).

While the above species is the only Melampus described from our fauna there are a number from this coast in the southern fauna. The list follows:

Melampus	tabogensis	(C.B. Adams),1852	Magdalena Bay to Panama
"	pyriformis	(Petit),1842.	Panama to Peru
"	trilineatus	(C.B. Adams),1852.	Panama
"	panamensis	(C.B. Adams),1852.	Panama
"	infrequens	(C.B. Adams),1852	Panama
"	concinnus	(C.B. Adams),1852.	Panama
"	bridgesii	Carpenter,1856.	Panama
"	luteus	Q. & G.,1832	Ecuador to Peru, Guam etc.
"	globulus	Ferussac,1835	Ecuador
"	acromelus	(Troschel),1852.	Peru
"	olivulus	Beck.	Guayaquil, Brazil etc.

While there are a number of species involved that are of the southern fauna the following key from the notebook of Mr. A.M. Strong would be of interest.

Family ELLOBIIDAE

Aperture long and narrow, spire blunt

. Columellar plait rather oblique, body smooth or plaites ....Melampus

.. Outer lip with internal parallel plaits

... Body with 1 plait

.... Columellarplait small, oblique

..... Greenish with indistinct whitish markings .... olivula
11 x 7½ mm Brazil and Ecuador Pfeiffer Cat. p. 16

.... Columellar plait large and lamelliform

..... Shining fulvous, with narrow chestnut bands ...... globulus
10 x 6 mm Ecuador Reeve Auricula 7-60

... Body with 3 plaits

.... Uniformly blackish chestnut colored .... tabogensis
13 x 8 mm Magdalena Bay to Panama Panama Shells #314

... Body with 3 plaits

.... Columellar plait nearly horizontal

..... Uniformly yellowish, solid, nearly smooth .... luteus
18 x 10½ mm Panama to Peru,Guam etc. Reeve Auricula 3-19

.... Columellar plait descending obliquely to the margin

.....Purplish with irregular brown tessellations .... olivaceus
16 x 9½ mm Monterey to Gulf of Calif. Oldroyd 2-1, p. 54

..... Flesh colored, with 4 brown bands .... acromelea
12 x 7 mm Peru Pfeiffer cat. p. 27

... Body with more than 3 plaits

.... Dark brownish red, with 3 white spiral lines..... trilineatus
18 x 11 mm Panama. Panama Shells # 315
.. Outer lip with indistinct plaits
... Olivaceus brownish, with yellow spots and streaks .. pyriformis
13½ x 8 mm Panama to Peru Reeve Auricula 7-60
.. Outer lip with a single internal rib
... Blackish brown, shining .... panamensis
11 x 5 mm Panama. Panama Shells # 312
.. Outer lip without plaits
... Body with 1 plait
.... Brown, an indistinct pale band near the suture ..... infrequens
6 x 4 mm Panama. Panama Shells # 311
... Body with 2 plaits
.... Blackish brown, with a yellowish spiral band .... concinnus
8 x 5 mm Panama. Panama Shells # 310
... Body without plaits
.... Blackish brown, shining .... bridgessi
9 x 3 mm Panama. P.Z.S. 1906, p. 161
Aperture long and narrow, spire blunt, continued
. Columellar plait perpendicular, body with 1 or 2 plaits .. Auricula
.. Columellar plait prominent, twisted
... Upper plait nodiform, middle one oblique
.... Surface with minute papillae, epidermis yellowish ... stagnalis
25 x 10 mm Panama to Ecuador. Reeve Auricula 2-3
... Upper plait indistinct, middle one horizontal
.... Brownish, slightly shining .... frumentum
6½ x 3 mm Peru. Reeve Auricula 4-22
.. Columellar plait callus, dentiform
... Yellowish fulvous, with irregular striae of growth ...... avena
6½ x 3½ mm Chile. Reeve Auricula 4-24
.. Columella with 2 plaits
... Pale, slightly striated .... pallidus (?)
2 x 1 mm Colombia Pfeiffer Cat. p. 103
Aperture semi-ovate to ovate, spire conical
. Columella with 2 plaits, body with 1 .... Pedipes
.. Whorls rounded
...Spiral sculpture of 1 strong & 3 shallow grooves ...... unisculatus
8 x 5 mm San Pedro to Gulf of Calif. Oldroyd 2-1, p. 53
... Spiral sculpture of regular raised threads .... liratus
3½ x 2½ mm Panama Oldroyd 2-1, p. 54
.. Whorls slightly angular, excavated above the angle
... Spiral sculpture of unequal ridges .... angulatus
7½ x 5 mm Panama Panama Shells # 308
. Columella with 1 plait, body with 1 to 5 tuberculate plaits.. Phytia
.. Body with a strong plait, above which are 2 smaller
... Pale to dark purplish brown .... setifer
10 to 3 mm Puget Sound to San Pedro Oldroyd 2-1, p. 53
.. Body with a single compressed plait
... Dark chestnut colored, shining .... reflexilabris
9 x 4 mm Ecuador to Chile Pfeiffer Cat. p. 115
. Columella with 1 plait, body with 2 converging plaits ... Marinula
.. Surface slightly striated, shell solid
... Fulvous, with irregular reddish brown streaks .... acuta
12½ x 5½ mm Panama to Ecuador Pfeiffer Cat. p. 45

.. Surface slightly wrinkled, an impressed line below suture
... Brownish green, scarcely shining .... pepita
14 x 7 mm Ecuador to Chile Pfeiffer Cat. p. 44
.. Surface wrinkled, opaque blackish, solid .... marinella
9 x 5 mm Peru to Chile and nigra Phil. m.s. Pfeiffer Cat. p.45

Some of the species in the above key follow:

Genus Auricula . .	
A. stagnalis d ' Orbigny,1835	Panama to Ecuador
A. pallida Sowerby	West Colombia
A. frumenta (Petit),1842	Peru
A. avena (Petit),1842	Chile
Genus Marinula	
M. acuta d'Orbigny,1835	Panama to Ecuador
M. marinella Kuster,1884.	Peru
M. pepita King,1831	Ecuador
Genus Detracia	
D. zeteki Pilsbry	Panama

Family TRIMUSCULIDAE (GADINIIDAE)

Genus Trimusculus Schmidt,1818. Type (by subsequent designation Rehder, 1940), Trimusculus mamillaris Linnaeus (Patella mammillaris L.)

* Note* Rehder, Harald A., " On the Molluscan Genus Trimusculus Schmidt"1818 with notes on Some Mediterranean and West African Siphonarias", Proc. Biol. Soc. Wash., vol. 53,pp 67-70, June 28,1940.

We are following Dr. Rehder on this genus which will place the following in the synonymy : Gadinia Gray,1824; Clypeus Scacchi,1833; Mouretia Sowerby,1835; Rowellia 'Cooper' Carpenter,1864.

" Shell low, conical or dome shaped; apex blunt, central or subcentral; sculpture radial or irregular; interior simple, without septum, an arcuate muscle scar above the margin. Animal an air breather, with a lung and without gills."

Trimusculus reticulatus (Sowerby),1835. Trinidad and Farallone Islands to Cape San Lucas (Dall).

Collecting data: The habitat is about high tide line on rocky shores . It is not really common although when found they are usually in colonies and one find is enough. Monterey, Playa del Rey, Santa Monica (breakwater), Palos Verdes, Point Firmin, El Morro Pt. N. of Ensenada,Mexico, La Jolla, Balboa, Calif. (Burch); Scarce at low tide under rocks. Large colonies on the roofs of caves exposed at low tide between Point Pinos and Point Lobos, where they are sometimes stained gray or pinkish by a species of coralline (A.G. Smith); rare, rocks at Silver Strand, Bird Rock, La Jolla (W.K. Emerson); San Martin Id., L.C. (Dr. F. Baker); So. Island Los Coronados in 3 to 8 fms. (Dr. F. Baker); San Diego and Pacific Beach (Kelsey); La Jolla (Bristol); San Geronimo Bay, L.C. (Lowe); San Clemente Island, San Nicolas Island, White's Point (Lowe).

Trimusculus peruvianus (Sowerby),1835.
Gadinia peruviana (Sowerby),1835. Gulf of California to Chile.

Not reported from California but seems to be the only other species described from this coast.

Family SIPHONARIIDAE

Genus Siphonaria Sowerby,1824. S. sipho Sowerby,18[illegible] type by original designation. Dr. A. Myra Keen advises that the date is 1823 (not 1824) as usually listed by authors.

" Shell solid, porcellanous, with subcebtral apex and radial sculpture; inner lateral teeth of the radula bifid, outer trifid." (Dall)

Subgenus Liriola Dall,1870. Type (by orig. desig.) S. thersites Carpenter. " Shell thin, horny, with apex eccentric; smooth or faintly radially striate. Habitat, cooler or temperate seas." (Dall).

Siphonaria thersites Carpenter,1864. Aleutian Islands to Strait of Fuca Type locality, Neah Bay, Washington.

Collecting data: Sitka, Ketchikan, Forrester Island, Alaska (G. Willett); on Fucus and under stones near high tide mark, Drier Bay, Mallard Bay and Thum Bay, Knight Island, Izhut Bay and Red Fox Bay, Afognak Id., Sitkalidak Id., Three Saints Bay, Kodiak Id., Shumagin Ids., Mitrofania Id., and Unalaska Id. (W.J. Eyerdam); Sitka, Alaska (H.N. Lowe); Prince of Wales Island (J. Henderson);

Subgenus Kerguelenia Rochebrune and Mabille,1889. Dr. Dall and others placed our species S. brannani in this subgenus. Thiele considers it to be a synonym of Liriola. For the interest of those who may study the group the original description follows:

" Testa capuliformi, ovato-elongata, convexa; vertice postico ad marginem incumbente, versus sinistram oblique torto.

Coquille capuliforme, ovale-allongee, convexe, a' sonnuet posterieur, incline' sur la marge, que, dans certains cas,il atteint, et un peu obliquement repete sur la gauche.

Ce nouveau geure, que nous formous aux depens des especes du geure Siphonaria, differe de ce deruier par les caracteres suivants: une forme generale, tres differente: le sonnuet completment posterieur; le test mince, fragile, a' peiue costule, simplement strie; le sillon mediocrement marque a' l' interieur, a' peiue sensible a' l'exterieur, partant du sonnuet pour venir aboutir sur ou pres du lord anterieur, par consequent plus ou mouis parallele ou oblique a' la ligne mediane de la coquille, au lieu de lui etre presque perpendiculaire."

Siphonaria brannani Stearns, 1872. Malaga Cove, Los Angeles Co. (Willett) to Acapulco, Mexico (Dr. F. Baker). Santa Barbara and Santa Catalina Islands (Dall). to Paetilla Point,Panama (Baker).

Collecting data: Malaga Cove, Los Angeles Co. in 15 fms. (G. Willett); dredged off Redondo Beach, Calif. in 15 to 25 fms. gravel bottom (Burch); Acapulco, Mexico, Magdalena Bay, and San Diego, Calif. (Dr. Fred Baker); Mazatlan, Mexico and Manzanillo (Orcutt); Laguna Beach, Calif. and Cape San Lucas, Mexico (H.N. Lowe).

Genus Williamia Monterosato,1884. Type (by monotypy) Ancylus ? gussonii da Costa (fide Woodring).

The following is an interesting note by Mr. A.M. Strong on this genus (Per. Comm. April,1945) " I believe that Williamia verhalis Dall is a good variety of Williamia peltoides living under quite different conditions. I have specimens collected at Magdalena Bay by Orcutt and labelled Williamia galapagana Dall and I suppose identified by him. They seem to at least be very similar to our Southern California dredged specimens. They appear to have been collected in beach drift and so there is no indic-

-ation of where they lived. The type of Williamia galapagana Dall and a good many specimens are in the Academy of Sciences at San Francisco. They were collected both in drift on shore and living attached to floating sea weed. They are very similar to our dredged shells but seem to live under different conditions. The description is in Proc. Calif. Acad. of Sciences 4th ser. vol. 11, pt. 1, 1917, p. 302. This is a paper on land shells"

Williamia peltoides (Carpenter),1864. Monterey to Gulf of California.
Type locality, Cape San Lucas, Mexico.

Grant and Gale, 1931, p. 463 place the following species W. vernalis in the synonymy of this species. It is true that the two forms are very close but in our experience the two forms are not taken together which would indicate that they are at least subspecifically distinct.

The manner in which certain animals with lungs are able to extract oxygen from the water has been explained by several authors. This genus is somewhat amazing though for an air breather. It is exceedingly abundant in the gravel off Redondo Beach in 25 fathoms, and we have brought up living specimens from over 75 fathoms off Redondo Beach associated with definitely deep water fauna.

Collecting data: Dredged off Monterey on the shale in 10 fms. and 20 fms., off Pacific Grove in 15 fms., Redondo Beach 25 to 75 fms., (Burch) 18 fms. off S. Coronado Island (Dr. F. Baker); Monterey, Pacific Grove etc. beach drift and 10-12 fathoms on rocks, living, a rare species (A.G. Smith); San Martin Island, L.C. (Dr. F. Baker); La Jolla (Orcutt); San Diego (Hemphill); Catalina Island in 30 fathoms, and San Pedro (Lowe).

Williamia vernalis(Dall)1870. Crescent City, Calif. to Gulf of Calif.
Type locality, Monterey, Calif.

Collecting data: San Onofre,Cayucos,La Jolla, Calif. littoral;Punta Banda, Lower Calif. littoral on stones in the rubble reef; dredged off Redondo Beach in 25 fms., Avalon, Catalina Island in 35 fms., Malaga Cove, Los Angeles Co. in 15 fms.; Monterey, in 10 fms. (Burch); Monterey from low tide to 12 fms. on rocks and shale fragments, fairly common (A. G. Smith); Carmen Island, Gulf of California (H.N. Lowe); Cayucos,Calif (Lowe and Caruthers); San Onofre, Calif. and San Nicolas Island,Mexico (H.N. Lowe); Magdalena Bay, L.C. (G. Willett).

Williamia galapagana Dall,1909. Magdalena Bay to Panama.
Not of our fauna but mentioned above.

Other species of the genus Siphonaria described from the southern fauna of this coast follow;

Siphonaria maura Sowerby,1835. Magdalena Bay to Ecuador
    var. lecania Philippi,1846 Magdalena Bay (Orcutt).
    var. palmata Carpenter,1857. Tres Marias Islands
    var. aequilirata Carpenter,1857.
Siphonaria gigas Sowerby,1825. Gulf of California to Peru.
Siphonaria scutella Deshayes Galapagos
Siphonaria lineolata Sowerby,1835. Nicaragua. Ecuador to Chile.
Siphonaria lessoni Blainville,1824. Peru to Magellan Strait.
Siphonaria (Kerguelenia) costata Sowerby,1835. Central Amer. to Chile
Siphonaria (Kerguelenia) tenuis Philippi,1860. Peru to Chile.

Family ONCHIDIIDAE

Genus Arctonchis Dall,1905. Type (by original designation) Onchidella borealis Dall. Harriman Alaska Expedition, vol. 13,1905, p. 112.

" Species small like Onchidella, but without muciparous glands on the lower side of the mantle, without dorsal eyes and with a jaw. Cool temperateand boreal coasts." (Dall).

This was described by Dr. Dall as a Section of Subgenus Onchidella under Genus Onchidium.

Arctonchis borealis (Dall), 1871. Port Moller and Aleutian Islands to Northern California. Type locality, Sitka, Alaska, on rocks near tide marks, especially on the small islets in the Bay".

The types are in the California Academy of Science, sealed in alcohol. Two additional sets collected by Hemphill from Coos Bay, Oregon also sealed in alcohol in the Hemphill collection of alcoholics in the C.A.S.

Mr. A.G. Smith sent the above information and also the following note " I think I have already mentioned the specimens of this in the Academy collection taken by Hemphill at Coos Bay and Fort Bragg. They look like small rough black limpets without shells and are apparently found on the rocks between tides. I have not found it on the Mendocino Coast mainly, I guess, as I didn't know what it was until recently and therefore could have easily overlooked it."

This group seems to be the reverse of some we have studied in that they seem to be land animals apparently returning to the sea. There are other species omitted from Bulletin 112 by Dr. Dall and also by other faunal lists. No doubt this has been done on the assumption that they are land animals and perhaps theyare. In fact it is questionable if the above species is properly placed in a list of the marine fauna. However, Dr. Dall discusses the following species in the same article in which he described A. borealis and in the interest of completeness we will give the limited data we have below.

Genus Onchidella Gray,1850. Type (by Sub. Desig. Herrmannsen,1852) Onchidium nigricans Quoy. (fide Dall,1905).

" Dorsal surface without arborescent processes, margin of the mantle with prominent spaces papillae, serving as conduits for mucuous glands; lower surface of the mantle with muciparous glands; dorsum with dorsal eyes; mouth agnathous. Warmer seas." (Dall)

Onchidella carpenteri W.G. Binney,1869. California and Puget Sound. Binney and Bland, Land and Fresh Water Shells,1869, p. 307; W.G. Binney, Manual of American Land Shells, U.S.N.M. Bull.28, 1885, p. 163; Dall, Harriman Alaska Expedition,vol.13,1905, pp. 113,114.

Dr. W.O. Gregg advises that being agnathous this species is certainly in a different genus than Arctonchis borealis.

Family TEREBRIDAE

Genus Terebra Bruguiere, 1789. Type (by monotypy, Lamarck, 1799), Buccinum subulatum Linnaeus. (fide Grant and Gale, 1931, p. 464).

Subgenus Terebra s.s.

" Shell of large or moderate size, heavy; sculpture generally rather low or absent; columella twisted, often with one or two folds" (Grant & Gale, 1931, p. 464). Not represented in the California fauna.

Subgenus Strioterebrum Sacco, 1891. Type (by original designation), Terebra basteroti Nyst. (fide Grant and Gale, p. 46[illegible]).

" Shell small or medium sized, slender; whorls sculptured with axial ribs and spiral threads or grooves, sutural band generally well defined; aperture rather narrow, anterior canal short, notched, columella generally with a broad basal fold" (Grant and Gale).

Terebra pedroana Dall, 1908. Redondo Beach, Calif. (Burch) to Scammon's Lagoon, L.C. (Keen, 1937) (lat. 27). Type locality, San Pedro, Calif. (fide Oldroyd, p. 60).

Grant and Gale, 1931, p. 469 make this species and the variety philippiana, which they place in the synonymy of typical pedroana , subspecies of T. albocincta Carpenter, 1857. Grant and Gale may be correct about this.

In the first place the nomenclature of the species is in question and we will no doubt soon have some corrections to make. Mr. A.G. Smith advises " Dr. Hanna has a paper in mss. in which he says that both of Dall's names are preoccupied."

Returning to the matter of pedroana vs. philippiana . The variety philippiana is supposed to be distinguishable from typical pedroana by its less distinctly developed axial ribs. However, the situation in most collections may be explained by an account of the discussion at the last meeting of the club. Mr. George Willett passed around a large box containing several hundred specimens with the comment " Both forms are there. Separate them if you can." The consensus of opinion seems to be that they are one species and that intergrades are too abundant for philippiana to even be considered a valid variety. Habitat may alter the form to some extent. Another comment by Mr. George Willett is of interest " A set in my collection collected by Connely at San Quentin Bay, labelled T. variegata Gray, looks much like the few beach specimens I have of T. Pedroana." Terebra pedroana philippiana Dall, 1920 will therefore be placed in the synonymy. Dr. Dall gave it the range " Santa Barbara to head of the Gulf of California" which would change the range of the typical northward to Santa Barbara. Dr. A. Myra Keen advises " According to the label on the holotype of Terebra pedroana philippiana Dall, the type locality is San Pedro. The holotype is U.S. Nat. Mus. no. 4943."

Collecting data: Dredged off Malaga Cove, L.A. Co. in 1[illegible] fms. and off Redondo Beach, Calif. and San Pedro in 5 to 15 fathoms, off Santa Monica in 7 fms., littoral on Terminal Island, Bird Rock, San Diego Co., San Onofre, dredged in 15 fms. off Ensenada, Mexico (Burch); off Newport Bay in 30 fms. (G. Willett); San Diego Bay (W.K. Emerson); Blanco Bay, L.C. (Cabrali); mission Bay (Baker and H.N. Lowe); Ocean Beach (Baker); The following labelled with the varietal name philippiana : Santo Domingo, L. C. (Orcutt); Magdalena Bay (Anderson); San Ignacio Lagoon (Hemphill); San Pedro, Calif. (Oldroyd, H.N. Lowe and Tremper); Acapulco (Dr. F. Baker). Obviously this record from Acapulco, Mexico by Dr. Baker should be checked. The specimens are in the collection of the San Diego Museum of Natural History.

The following list of species of the genus Terebra covering the entire west coast will be of interest to some of the members. This is taken from Mr. A.M. Strong's notebook.

Genus Terebra Bruguiere,1789.
Terebra robusta Hinds,1844. (San Blas to Panama)
" var. lingualis Hinds,1844 Panama. Near Mazatlan.
Terebra strigata Sowerby,1825. (Panama and Galapagos).
Terebra pedroana Dall,1908. (Santa Monica to Gulf of Calif.
var. philippiana Dall,1920.
Terebra albocincta Carpenter,1857. (Gulf of California).
var. hindsii Carpenter,1857.
var. rufocinerea Carpenter,1857.
var. subnodosa Carpenter,1857.
Terebra variegata Gray,1834. (Gulf of Calif. to Panama).
Terebra balaeonora Dall,1908. (Lower California).
Terebra lucana Dall,1908. (Cape San Lucas)
Terebra specillata Hinds,1844. (San Blas, Panama). (near Mazatlan)
Terebra tuberculosa Hinds,1844. (San Blas to Panama)
Terebra ligyrus Pilsbry & Lowe,1932. (Guaymas to Acapulco)
Terebra ira Pilsbry & Lowe,1932. (Mazatlan) (Gulf of California)
Terebra isopleura Pilsbry & Lowe,1932. (Mazatlan)
Terebra roperi Pilsbry & Lowe,1932. (Mazatlan)
Terebra malonei Vanatta. (Santa Rosalia)
Terebra alata Hinds,1844. (Central America).
Terebra varicosa Hinds,1844. (Central America)
Terebra radula Hinds,1844. (Central America)
Terebra brunneocincta Pilsbry & Lowe,1932. (Nicaragua) (near Mazatlan)
Terebra corintoensis Pilsbry & Lowe,1932. (Nicaragua) (Gulf. Calif.)(Panama
Terebra sanjuanensis Pilsbry & Lowe,1932. (Costa Rica)
Terebra armillata Hinds,1844. (Acapulco,Nicaragua to Panama,Gulf Calif.)
Terebra aspera Hinds,1843. (Acapulco, Panama to W. Colombia)
Terebra panamensis Dall,1908. (Acapulco, Panama).
Terebra bridgesi Dall,1908. (Panama)
Terebra paphia Bartsch (Acapulco)
Terebra cracilenta Li,1930. (Panama)
Terebra melia Pilsbry,1931. (Panama)
Terebra montijoensis Pilsbry & Lowe,1932. (Panama)
Terebra ornata Gray,1834. (Cape San Lucas) (Galapagos).
Terebra frigata Hinds,1844. (Galapagos)
Terebra larvaeformis Hinds,1843. (Ecuador)
Terebra gemmulata Kiener,1839. (Chile)
Terebra (Microtrypetes) iola Pils. & Lowe,1932 (Mazatlan)
Terebra (Microtrypetes) polypenus Pils. & Lowe,1932. (Mazatlan)
Terebra (Microtrypetes) mariato Pils. & Lowe,1932. (Panama).
Terebra (? Perirhoe) stylus Dall,1908. (Panama)
Terebra (?) guayaquilensis E.A. Smith,1880. (Ecuador)
Terebra (Subula) rooseveltii Bartsch,1939. (Socorro Island).
Terebra glauca Hinds,1844 (Panama)
Terebra luctuosa Hinds,1844 (Gulf of Calif.)
Terebra incomparabilis Desh.,1859. (Panama)
Terebra galapagensis Dall. (Albemarle Island).

The following key to species of the genus Terebra is taken from Mr. A.M. Strong's notebook.

Genus Terebra

Whorls with a sutural band set off by a groove .... Subgenus Strioterebrum.

Lower whorls smooth except for lines of growth
. Band wide, groove a little above the middle of the whorl
.. Yellowish white, with irregular vertical axial chestnut stripes
136 x 32 mm. Panama & Galapagos .... strigata
Reeve fig. 5 Sowerby pl. 61, fig. 10. Tryon pl. 2, f. 29.

. Band narrow
.. Last whorl globose or bulbous
... Whitish with retractive axial chestnut flames forming two obscure spiral bands.
138 x 30 mm San Blas - Panama .... robusta
Reeve fig. 10 & 49. Sowerby pl. 62, fig. 35. Tryon. [illegible] f. 1[illegible], 17.

.... Sutural band doubly crenated .... variety lingualis
Reeve fig. 15 Sowerby pl. 63, fig. 50

.. Last whorl short, base contracted
... Yellowish white, three spiral rows of chestnut spots
88 x 24 mm Galapagos .... ornata
Reeve fig. 14 Sowerby pl. 62, fig. 34 Tryon pl. 2, fig. 28

Lower whorls with a spiral groove or cords
. Sutural band raised, more or less nodulose
.. Body whorl with a light peripheral band showing as a white line inside the aperture
... Adult shell stout and over 2 inches in length
.... Sculptured with spiral grooves and lines of growth only or faint axial ribs.
..... White to bluish-gray, with reddish or brownish interrupted spots
72 x 16 mm Gulf of California .... variegata
Reeve fig. 12 Sowerby pl. 63, fig. 52 Tryon pl. 2, fig. 15

.... Sculptured with spiral grooves and strong axial ribs
..... Brownish, obscurely banded and spotted
54 x 14 mm Panama to Galapagos .... armillata
'Reeve fig. 12 Sowerby pl. 61, fig. 49. Tryon pl. 2, figs. 21, 23.

.... Sculpture nodulous, with spiral cords and axial ribs
..... Three spiral rows of tubercles
...... Pale orange to dark brown, variously maculated
54 x 15 mm Panama to W. Colombia .... aspera
Reeve fig. 40 Sowerby pl. 63, fig. 44 Tryon pl. 1, fig. 7

..... Four spiral rows of tubercles.
...... Reddish brown, faintly banded
40 x 11 mm Central America (loc. doubtful) ...... radula
Reeve fig. 68 Sowerby pl. 64, fig. 95 Tryon pl. 7, fig. [illegible]7

..... 3 to 5 spiral rows of tubercles
...... Of a general brownish tint
22 x 6 mm Panama (Probably young) .... panamensis
Bull. Mus. Comp. Zool. vol. 43, p. 250

... Adult shell slender, less than 2 inches in length
.... Spiral sculpture of incised grooves
..... Sutural band nodulous on early whorls only
...... Axial ribs low but distinct
.... Bluish white to yellowish brown, irregularly blotched
32 x 6.5 mm Southern California .... pedroana
Bull. Mus. Comp. Zool. vol. 43, p. 251

...... Axial ribs reduced to mere lines of growth
variety philippinarum
Ann. Mag. Nat. Hist. v. 15 p. 394 as M. simplex Carpenter.

..... Sutural band nodulous on all whorls
...... Spiral sculpture of 4-5 spiral grooves
.... Axial ribs distinct on early whorls only
.... Purplish brown to olivaceous,sutural band whitish
40 x 8.5 mm Gulf of California .... albocincta
Mazatlan Catalogue #450

.... Axial ribs obsolete, spiral grooves strong
.... Whitish, faintly spotted with reddish brown
31 x 7 mm Gulf of California .... hindsii (var.)
Mazatlan Catalogue # 451

.... Axial ribs strong, spiral grooves faint
.... Uniform reddish brown, sutural band pale
30 x 6 mm Gulf of California .... rufocinerea (var.)
Mazatlan Catalogue # 453

.... Surface faintly beaded
.... Whitish, tinted with red-brown
30 x 9 mm. Gulf of California .... subnodosa (var.)
Mazatlan Catalogue # 452

.... Axial ribs and spiral grooves distinct on all whorls
.... Reddish white, red banded at base
25 x 5 mm. Central America .... elata
Reeve fig. 128

.... Shining white (a doubtful species)
23 x 6 mm. Galapagos .... frigata
Reeve fig. 132 Sowerby pl. 64, fig. 71 Tryon pl.7, f.26

...... Spiral sculpture of about 6 grooves
.... Axial ribs distant (about 12 on body whorl)
.... Livid purple, whitish on ribs
10.5 x 2.5 mm Panama .... bridgesi
Bull. Mus. Comp. Zool. v.43, p. 253

.. Periphery and inside of aperture without color band
... Axial ribs strong on all whorls
.... Spiral sculpture of incised grooves
..... Axial ribs only slightly waved
...... Whitish, blotches of flesh color
44 x 9 mm. San Blas .... specillata
Reeve f. 75 Sowerby pl. 65, fig. 116 Tryon pl.7, f. 18

..... Axial ribs strongly curved
...... Pinkish white to rich brown, unicolor
58 x 12 mm Santa Elena,Ecuador .... larvaeformis
Reeve f. 41, Sowerby pl. 63, figs. 46,46 Tryon pl. 3,66

.... Spiral sculpture of raised cords
..... Spiral cords about 4
...... Yellowish white, faintly banded with transparent flesh color.
52 x 13 mm. Ecuador .... plicata
Reeve f. 76 Sowerby pl.63, f. 61 Tryon pl.7, f.20

..... Spiral cords about 7
...... Flesh colored, with occasional brown flecks
27 x 6 mm. Lower California .... balaenora
Bull. Mus. Comp. Zool. v. 43, p. 252

..... Spiral cords about 12
...... Straw colored
36 x 7 mm Cape San Lucas .... lucana
Bull, Mus. Comp. Zool. v. 43 , p. 252

. Sutural band nodulous, followed by a smooth band, then 3 spiral rows of nodes.
.. Transparent ash, obscurely red spotted, purplish towards apex
55 x 15 mm San Blas to Panama .... tuberculosa
Reeve f. 61 Sowerby pl. 63 fig. 48 Tryon pl.7, f. 31.

. Sutural band with a double row of nodes, separated by a groove
.. White, more or less banded with reddish brown
45 x 12 mm Chile .... gemmulata
Reeve fig. 33

. Sutural band excavated
.. Axial ribs strong, whorls strongly rounded
... Variously purple banded
23 x 8 mm Central America .... varicosa
Reeve fig. 120 Sowerby text pl. 163 Tryon pl.7, f. 12

Family CONIDAE

Genus Conus Linnaeus,1758. Type (by subsequent designation, Children,1823), Conus marmoreus Linnaeus. (fide Grant and Gale,1931, p. 471). Clench in Johnsonia, no.6, p.3 states " According to Iredale (1930, p.79), the genotype of Conus is C. litteratus Linnaeus , designated by Swainson (1940, Treat. Malac. p. 148). However, we accept the advise of Dr. A. Myra Keen as follows (Per. Comm. April,1945) " Re the type of Conus: I have looked up Iredale's statement but cannot concur with him. Children in 1823 designated C. marmoreus in a perfectly valid manner so far as I can determine."

" Shell obconic, usually heavy and strong, generally ornamented with bright colors which are diffused, banded or spotted. Aperture generally long and narrow with a simple lip. Whorls numerous, rather tightly coiled and moderately descending. Inner whorls generally absorbed to a paper-thinness. Sculpture when present usually of a minor nature consisting of low riblets which may be smooth or tuberculate. Periostracum thin to heavy and often sculptured to a moderate degree. Teeth relatively few, proportionately long and equipped with a poison gland. This aparatus is capable of injecting an exceedingly powerful neurotaxin into its prey." (Johnsonia. no.6, p. 3).

Conus californicus Hinds,1844. Farallone Islands, California to Ballenas Lagoon, Lower California, Mexico (Dall). Type locality, Magdalena Bay, Lower California, Mexico in seven fathoms, on a sandy floor". (fide Grant and Gale, p. 472).

Collecting data: This is the only species of Conus in our fauna and is exceedingly common the length of the range being taken far up in all estuaries as wellas along the open coast and down to at least 25 fathoms. It seems to favor sand or gravel bottom when dredged rather than mud and is found in more or less the same habitat littoral. The only thing of particular interest in our experience with this species is that it seems to develop local races of varying sizes and shapes. One interesting item is the phenomenal size of the specimens dredged off El Segundo, Calif. in 15 to 20 fathoms. The water there is badly polluted by sewage from the great Los Angeles outfal swwer which has been causing so much litigation and trouble. Incidentally the Recent specimens from this locality are almost a perfect fit for the fossil variety fossilis Oldroyd. The species attains exceptional size in Morro Bay also, Other localities produce consistently very small specimens. The color varies also. Of course, it is but one species. (Burch).

Mr. A.G. Smith reports on this species from Monterey " Fine large specimens (as large as fossilis) live at extreme low water in sand pockets between the rocks at Monterey and Pacific Grove. Also dredged down to 15 fms. in the Bay. Dr. Hanna is of the opinion that the large size of the El Segundo Conus is due probably not to the fact that it lives and waxes fat on the garbage, but rather on the other organisms attracted by the garbage and sewage. His ideas are based on a recent study of the radula of C. californicus."

Dr. A. Myra Keen also notes on this matter " As to large specimens of Conus californicus: Mrs. Oldroyd labelled some as C. c. fossilis. Like most of Mr. Oldroyd's varieties, this one seems to be only ecological."

The species is reported from San Martin Island, Lower California by Dr. Fred Baker.

The following list of species of the genus Conus covering the entire west coast will be of interest to some of the members. This is taken from Mr. A.M. Strong's notebook.

Genus Conus Linnaeus,1758.
Conus californicus Hinds,1844. (Farallones to Ballenas Lagoon).
Conus arcuatus B. & S.,1829. (Cerros Island to Panama)
Conus tornatus Broderip,1833. (Cerros Island to Ecuador)
Conus scalaris Val. (Cerros Island to Panama)
Conus comptus Gould,1856 *- perplexus Sby. (Cerros Island to Costa Rica)
Conus monilifer Brod. & Sby.,1833. (Magdalena Bay to Peru)
Conus mahogani Reeve,1843. (Magdalena Bay to Panama)
Conus lucidus Mawe,Wood,1828. (Magdalena Bay to Galapagos)
Conus purpurascens Sowerby,1833. (Magdalena Bay to Peru)
Conus princeps Linnaeus,1758. (Gulf of Calif. to Peru)
Conus gladiator Broderip,1833. (Gulf of Calif. to Panama) (Ecuador)
Conus brunneus (Mawe) Wood,1828. (Gulf of Calif. to Ecuador)
Conus nux Broderip,1833. (Gulf of Calif. to Ecuador)
Conus incurvus Brod. ? -- recurvus Brod. (Gulf of Calif. to Ecuador)
Conus gradatus (Mawe) Wood,1828. (Gulf of Calif. to Panama)
Conus regularis Sowerby,1841. (Gulf of Calif. to Panama)
Conus dispar Sowerby,1841. (Gulf of California)
Conus dalli Stearns (Gulf of Calif. to Panama)
Conus edaphus Dall (Gulf of Calif. to Central America)
Conus archon Broderip,1833. (Gulf of Calif. to Central America).
Conus emarginatus Reeve,1843. (Acapulco,Mex. to Ecuador)
Conus vittatus Hwass?Bruguiere,1792. (Acapulco to Panama)
Conus pyriformis Reeve (Central America)
Conus fergusoni Sowerby,1875 -- xanthicus Dall (Central America to Panama) (Mazatlan Bay, West Mexico).
Conus ximenes Gray,1839 (Acapulco; Panama to Peru) (Punta Penasco)
Conus scriphus Dall,1911 or 10 (Panama)
Conus vergatus Reeve (Gulf of Calif. to Ecuador)
Conus tiaratus Broderip (Galapagos)
Conus signae Bartsch,1939. (Gulf of Calif. to Panama)
Conus magdalensis Bartsch & Rehder (Magdalena Bay)
Conus recurvus Brod. (West Mexico)

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The following key to the species of the genus Conus is taken from Mr. A.M. Strong's notebook.

Genus Conus

Shoulder of the whorls tuberculate
. Tubercles on early whorls only
.. Whitish, tinged with flesh color
75 mm. Central America .... pyriformis
Reeve, fig. 70

. Tubercles becoming faint on the body whorl
.. Brownish, orange or pink, with darker axial stripes
60 mm Gulf of Calif. to Peru .... princeps
Reeve, fig. 36a

.. Brown, with axial streaks and obscure central spiral band of white
40 mm. Gulf of Calif. to Panama .... gladiator
Reeve, fig. 127

. Tubercles distinct on all whorls
.. Brownish, with one or two spiral bands of white spots
40 mm. Gulf of Calif. to Ecuador .... brunneus
Reeve, fig. 72

.. White, with two spiral bands of dark blotches, base and lower end of aperture purple.
25 mm. Ballenas Lagoon to Panama .... nux
Reeve, fig. 110

.. Pale rose color with a few brown spots
Panama to Peru .... ximenes
Reeve, fig. 224

Shoulder of the whorls carinated
. Spire much elevated
.. White, with broad waved brown streaks
Acapulco to Ecuador .... emarginatus
Reeve, fig. 152

.. Whitish, marbled and streaked with chestnut
40 mm. Cerros Island to Panama .... arcuatus
Reeve, 77 b

.. Brownish white, with spiral rows of dark dots and two faint darker spiral bands
25 mm. Cerros Island to Ecuador .... tornatus
Reeve, fig. 68

. Spire relatively short
.. Livid flesh color, spotted and clouded with brown
25 mm. Gulf of Calif. to Ecuador .... incurvus
Reeve, fig. 158

.. Yellowish white, with zigzag brown streaks and a lighter central band
35 mm. Panama .... scariphus
Proc. U.S.N.M. 38-225

Shoulder of whorls not nodulous or carinated
. Spire elevated, with a concave outline
.. Whorls sharply tabulated, forming a turrites spire
... Yellowish white, with brown axial stripes and a narrow white central band
75 mm. Cerros Island to Panama .... scalaris
Tryon, v.6, p. 35

... White with reddish brown axial clouding
Gulf of Calif. to Panama .... gradatus
Reeve, fig. 140

Shoulder of whorls not nodulous or carinated, continued
. Spire elevated, with a concave outline, continued
.. Whorls broadly, rather flatly tabulated
... Whitish, stained and banded with brown spots
60 mm. Mazatlan to Panama .... regularis
Reeve, fig. 146

... More slender, with smaller and more distant spiral rows of squarish brown spots
50 mm. Magdalena Bay to Peru .... monilifer
Reeve, fig. 144

... Spire much shorter, with obscure indications of paler spiral bands
Gulf of Calif. .... dispar
Sowerby, Conch. III, fig. 57

.. Whorls narrowly sloping or rounded
... Whitish, with longitudinal clouds and close spiral rows of small chestnut spots.
Magdalena Bay to Panama .... mahogani
Reeve, figs. 125 & 126

... Shell stouter, with the spiral markings tending toward an anterior and posterior band
30 mm. Cerros Island to Costa Rica .... comptus
Reeve, fig. 116

. Spire low, convex or flat sided
.. Whorls channeled between shoulder and suture
... Shell uniformly white or light colored
140 mm. Central America .... fergusoni
Tryon, vol. 6, p. 15

... Clouded with white or violaceous and brown or olive
75 mm. Magdalena Bay to Peru .... purpurascens
Reeve fig. 105

... White, with broad brownish yellow areas forming three bands
42 mm. Guaymas to Panama .... xanthiocus
Proc. U.S.N.M. 38 p. 225

.. Whorls not channeled
... Color patern of close, regular markings
.... Yellowish brown, with brown axial stripes and four rows of white spots
55 mm. Gulf of Calif. to Panama .... dalli
Tryon, f.6, p. 91.

.... White, reticulated with brown lines
60 mm. Magdalena Bay to Galapagos .... lucidus
Reeve, fig. 52

.... Waxen white, with spiral bands of alternating red and white spots
25 mm. Gulf of California .... edaphus
Proc. U.S.N.M. 38 p. 223

... Color patern irregular or indistinct

.... Pink brown, with axial maculations and spiral rows of brown leaving a central light band
50 mm. Acapulco to Panama .... vittatus
Reeve, fig. 75

.... White, with irregular brown streaks and a few brown spiral lines
60 mm. Mazatlan to Central America .... archon
Proc. U.S.N.M. 38 p. 223

.... Brown, with small, irregularly placed white spots
30 mm. Farallones to Ballenas Lagoon .... californicus
Reeve, fig. 224

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Family TURRIDAE

* Note* Inasmuch as Dr. Paul Bartsch is working on his monograph of this family, and Dr. Bartsch has written that it will not be long delayed, we have elected to by-pass this group for the time being and return to it later hoping that Dr. Bartsch's work will be by then completed.

Mytilus edulis diegensis , new subspecies

By Dr. Wesley R. Coe, The Scripps Institution of Oceanography, La Jolla, California.

I was much interested in the discussion in the minutes of the Conchological Club, No. 36, relative to the status of the species of Mytilus which has become so abundant along our coast in recent years. It was first found on the pier of the Scripps Institution in August,1943. In the early summer of 1944 there were extensive colonies covering all suitable situations on the piles, on ropes and boxes suspended from the pier, as well as on many of the rocks in the vicinity. Most of these colonies failed to survive the summer but a few still remain.

After culturing the newly arrived Mytilus in experimental boxes for a year and a half and studying large collections from a variety of habitats from San Pedro to the Mexican border, I have come to the conclusion that this is not an introduced species in spite of its behavior. I have compared hundreds of shells of all ages with some that were collected near San Diego many years ago and can find no consistent differences. But I do find differences between this form and the typical introduced M. edulis of San Francisco Bay and M. edulis trossulus of Puget Sound. Our southern form is in my opinion an endemic subspecies of M. edulis previously unrecognized as such. This I am calling M. edulis diegensis. It is distinctly different from M. grayanus and from all the subspecies of M. edulis or other species described in the recent monograph by Lamy.

A rapidly fluctuating population such as is well known to occut with M. edulis in other localities and as we know for Donax and other mollusks may, perhaps, explain the sudden increase to such vast numbers.

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The Mytilus discussed above was figured in Minutes # 36, p.6 and the data given on pages 8,9. In Minutes # 41, pages 7 to 13, Mr. Allyn B. Smith covered the problem at length.

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Corrections and Additions

Minutes # 48, p.9. Pleurobranchus californicus Dall,1900. Mr. A.G. Smith reports the following: " 11 mi. n. of Fort Bragg; 1 specimen. Beach at Pacific Grove, 2 specimens. Breakwater, North Island (San Diego), 12 specimens. A rare species found under rocks at low tide."

Minutes # 47, p. 10. Acteon punctocoelata Carpenter. Mr. W.K. Emerson reports it from Point Loma, San Diego Co.

Minutes # 47, p. 12- Acteocina culcitella (Gould),1852. Mr. W.K. Emerson reports this species from Mission Bay.

Minutes # 47, p. 15- Coleophysis carinata (Carpenter),1857. W.K. Emerson reports this from Mission Bay, San Diego Co.

Minutes # 43, p.27- Solen sicarius Gould,1850. Mr. Morris E. Caruthers reports taking this species a mile inside Morro Bay, San Luis Obispo Co.

Minutes # 43, p. 27. Ensis californicus Dall,1899. Mr. Morris E. Caruthers reports taking this species in Newport Bay and also in Mission Bay.

Minutes # 43, pp. 27,28. Siliqua lucida(Conrad),1837. Mr. Morris E. Caruthers reports taking this species in Mission Bay, Newport Bay and also from one mile inside Morro Bay.

Dr. David T. Jones, University of Utah, Salt Lake City, Utah. " Please change the address on the copies of the " Minutes of the Conchological Club of Southern California" that you are sending to me-- to
E.J. Roscoe, 2364 So. 9th St., East, Salt Lake City (5), Utah.

I shall be on leave of absence from the University of Utah, starting soon now, and Mr. Roscoe will be in charge of the Mollusca in the Invertebrate Museum here. Thanking you for making the change,"

Professor T.D.A. Cockerell, 908 10th St., Boulder, Colorado. Prof. Cockerell has been spending the winter in charge of the Desert Museum, Palm Springs, Calif. He has sent us an interesting paper reprinted from " The Museum News, Jan. 1,1945 entitled " Small Museums in the West". An extract from his letter is interesting " We leave here on May 15 for Colorado... I have just finished a rather long paper on the Colorado Desert of California to be published by the Kansas Academy of Science (Lawrence, Kansas) in June. It includes a discussion of the shells of Lake Cahuilla (Pleistocene).

Mrs. C.E. Peavey, 1490 N.W. 39th St., Miami 37, Florida. We are very glad to add Mrs. Peavey's name to our mailing list and welcome her to our circle.

Edward P. Burch, Minnesota Museum of Natural History, University of Minnesota, Minneapolis 14, Minnesota. " You may hereafter send the Minutes of the Conchological Club of Southern California to my new address where I have been located for several years as Curator of Conchology; and am now engaged in bringing the shell collection up to date, so far as nomenclature is concerned. Many of our 20,000 shells are 60 to 70 years old and represent an accumulation. During the past winter I have been in Cuba, working with Dr. de la Torre on a complete set of the Polymita and on other Cuban shells. Your very stimulating minutes are greatly appreciated, because they record a lot of painstaking work."

Mr. E.P. Baker,417 S. Downey Ave., Downey, Calif. We were glad to hear from Ned again and assume that he is recovering from his recent operation in good order. He writes " May I call your attention to the April number of "Nature" Magazine if you have not already seen it. The article by Dr. Palmer is of West Coast Shells, also see his " school page" toward the back of the magazine where he introduces John Burch and the Minutes. The article on "Shell-craft" and other notes in the back section are of interest."

Professor H.B. Stenzel, Geologist, Bureau of Economic Geology, The University of Texas, University Station, Box B, Austin 12, Texas. " If you by any chance have shells of species of Ostrea or Lopha available, I would appreciate having a chance of obtaining them, pteferably by purchase." Ifa any of the members have duplicate material in these groups please send them to our correspondent. Our own duplicates have been so well picked over that we have little left worth while.

Mrs. Carroll Hodge, Glynwydd, Ithan, Pa. " Please send me a list of some of your west coast shells for exchange. Have a good assortment of shells from all over Florida.". Members interested in exchanging will please note.

Miss Katherine Lannon, 19 E. Mission St., Santa Barbara, Calif. Interested in shells pertaining to elementary education.

Mrs. Fiske Warren, 8 Mt. Vernon Place, Boston, Mass. In a personal letter to Thomas A. Burch recently Mrs. Warren expressed her desire for several dozen paits of deeply colored Pecten hericius, all ages. Perhaps some of our members around Puget Sound will be able to take care of this. None of us from southern California have been able to collect these for several years. Mrs. Warren inclosed an interesting paper " Symbolism,Design and Education" and suggested that we visit the shell collection on view at the Santa Barbara Museum of Art. If any of our members attended we would like to hear about it.

Dr. Paul Bartsch, Curator Division of Mollusks and Cenozoic Invertebrates, Smithsonian Institution, United States National Museum, Washington 25, D.C.

Your package containing the type of the species described by you came to hand almost simultaneously with the minutes. We, of course, are extremely happy that you made the U.S. National Museum the repository for these specimens. We have assigned to them the following catalogue numbers:

434052	Nuculana penderi redondoensis J.Q. Burch
434053	Cardita redondoensis J.Q. Burch
434051	Macoma morroensis T. Burch
434054	Bulla esteroensis J.Q.Burch

It will interest you to hear that I prepared, a little while ago, a paper on the mollusks of the Pacific world for the New York Zoological Society which contains sixteen plates. This is being published by Macmillan Company in bound form, and by the Infantry Journal in paper cover. The two are supposed to come out simultaneously sometime in May."

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Mr. A. Sorensen, 247 Granite St., Pacific Grove, Calif. We were indeed sorry to hear that Andy's proposed excursion to Mexico had to be postponed for another year. But we are very happy to conform to his request that we send copies of our minutes to,

Mr. George Pattison, 68 Partridge St., Glenley, South Australia.

Dr. B.R. Bales, 149 West Main St., Circleville, Ohio. " Dear John: Just back from a fine winter's collecting on the Fla. Keys. Found five numbers of Minutes waiting for me and as soon as I had most of the winter's take unpacked, began several hours good reading. No use talking, they are getting better and better all the time and I am sure you are accomplishing a really great task. I like Tom's drawings- they give me an adequate picture of the shell parts depicted.

We had a very successful winter and I brought home a lot of loot. We were established at Marathon, on Key Vaca, and worked north from there to Conch,Grassy,Bonefish, and Lower Matecumbe Keys; working south, we had Ohio,Missouri,Bahia Honda, and Little Duck Keys. I have collected in the region so often that I knew about where to go and when to go to the various Keys, though I did a lot of my collecting back of our cottage (Boot Key Harbor) where I took the festive mollusk the hard way-- by screening. Most of the material so taken has not yet been identified, but I am sure that I have some good things in the lot. We were fortunate in taking specimens of Cancellaria reticulata adeleae Pilsbry at Little Duck Key. These are plenty rare and I think none have been taken at any other place on the Keys. I am sure that there are less than two dozen known in collections, so all are locotypes. Dr. Pilsbry and Tom McGinty are working on a series of papers to appear in some future numbers of the Nautilus. They are working on the " little fellers"- Cyclostrema etc. and Tom is making some wonderful drawings to illustrate the articles. Have had a rather successful Cypraea season- took quite a few Cypraea exanthema, C. exanthema cervus, one lonely Cypraea cinerea, a couple dozen Cypraea spurca. These latter are surely little beauties when alive. Collected with Tom McGinty and Mr. and Mrs. Ralph Humes at Night with gasolene lanterns on Peanut Island in the northern end of Lake Worth. Plenty of imature Tonna galea, Architectonica granulata, Hydatina vesicaria, Cassis gibbus and the like. We left Boynton at about eleven P.M. and were back home in time for breakfast the next morning. Day collecting at the same place gave us plenty of Cypraea spurca, Trivia pediculus, Oliva sayana, Murex pomum, Conus mus, Tellina interrupta, Mitra nodulosa, Strombus pugilis, Strombus raninus nanus, and many other good things.

Collecting in Miami was good. A dozen and a half Cypraea exanthema and cervus, Pecten imbricatus, a beautiful white Pecten mildredi, four varieties of Lima, and " sich".

Our son finally got a break. He was stationed away up on the Gulf of St. Lawrence where the temperature often got down to 40 below zero. He is now stationed at Bermuda and I am hoping to see some shells rolling in from there some of these days."

Mr. Fred S. Webber, 271 Maple St., Holyoke, Mass. " I enjoy the Minutes and am glad to help a bit. Just back from Fla. Had a good visit with Doc Bales- Ralph Humes and Ted Dranga."

L.M. Wright, CEM, USN, 418 Plaza Hotel, Miami, Fla. We are sorry that the last issue of out Minutes arrived in poor condition. If any others get them torn please advise us. We mail the things the easiest way which is flat but if they are not getting through perhaps we had better start rolling them again. Thanks for the following bouquet " Your key to small gastropods of the W. coast as reprinted from Strong,1934 is splendid. All we need on the E. coast is someone to do the same for our side."

Sociedad Malacologica " Carlos De La Torre, Apartado 2634, Habana,Cuba. We are honored to send them a file of our Minutes. The " Revista" published by this organization is a splendid booklet. The plates are very good. All interested in building up a conchological library should subscribe. The price we understand is $2.50 per year.

Mr. W.J. Eyerdam, 7531 19th Ave., N.E., Seattle 5, Wash. sends a clipping from The Seattle Times, April 12,1945 that is very interesting indeed. The article is by Robbin Coons, Dateline: Pacific and entitled " Seeker of Seashells Helps Yanks Find Way on Okinawa". Associated Press Foreign Staff. Okinawa,April 1.-- (D. Day)--(Delayed)-- A 62 year old scientist with an ingrown passion for sea shells- and for anonymity- played a striking role in today's American invasion of this island " front porch" to the Japanese homeland. Tall, lank, mellow and full of tales of his 48 years in the Pacific, he is along with the invasion forces- a civilian in uniform who says he would gladly have paid $5,000 for the priviledge of joining the invasion fleet. " And I'm getting paid for it" he chuckled, his bald forehead wrinkling. He Was There Before. It was his years-old quest for rare shells that led him in 1932 to spend a vacation of several months combing the sandy shores of this island which is the most daring American objective in the Pacific war to date. His visit there has enabled him to give invasion planners the benefit of his observations concerning the terrain, the natives, the flora and fauna to be encountered. " But dont print my name", he pleaded. " Some folks like publicity, but I- I'm crazy maybe, but I can't stand it. And I mean it." This, however, can be said . He is a native of Cooperstown,Griggs County, N.D.,and he left home when he was 14 years old, in 1897, for Hawaii. Japs Interned Him. He has concentrated on the study of mollusks (malacology) and his quest for scientifically valuable specimens has taken him to islands and atolls all over the Pacific. For 20 years- to support his quest, which is more a "disease" than a hobby with him, he affirms- he taught English at a Japanese University. And one of the islands he visited, and found rich in malacological treasures, was Okinawa. On December 8,1941, he was arrested without explanation and kept in solitary confinement in a Japanese prison, unaware that Japan and America were at war until the following June, when he was released for exchange. His collection of 300,000 shells, representing 13,000 different species of mollusks, is held jointly with a 78 year old partner he met in Hawaii soon after he reached there in 1897. It will go eventually to one of three museums of natural history societies with which he is affiliated. His faded blue eyes gleam when he talks of shells. " I can look at a beach and tell whether there's anything worth while on it," he said. "I've taken all the good shells from Okinawa already, my last trip. To me a shell is more fascinating than a beautiful woman." Natives Docile. Natives of Okinawa, according to his observations, are likely to prove docile unless ordered toresist by their Japanese masters. They are accustomed to obedience, blind and unreasoning. Most of them are frugal but rather shiftless,and diseases are common. The principal city, Naha, is primitive, more like a Chinese city than Japanese. The main industry is lacquer, Okinawa's lacquer work being world-noted. But the ardent malacologist does not bear out the island's reputation for poisonous reptiles. " The only snakes I saw," he says, " were in the zoo".

Eyerdam tries to solve the puzzle of " Who is this man?". He says " My guess is that either he or his partner are Langford from Honolulu. I remember when he went to Japan to look for shells right after the great earthquake in 1923 and he found a number of n. sp. on the raised beaches." Mr. Eyerdam also mentions that he is completing a large exchange of over 400 species with Mr. Moses of England which reminds the editor here that he owes Mr. Moses a box of shells.

Mr. Henry Dodge, 6 Rochambeau Road, Scarsdale, N.Y. " You are doing a great job and giving splendid service to conchologists not only on the coast but the country over. I hope some day to be able to contribute notes of value to the minutes, but for the present I am ... of Pacific Coast species... I have retired from active business,and soon perhaps I will be coming to Southern California to live and, of course, will be a member of your club. Mrs. Dodgeand I are really considering the idea, when the war is over. " It is needless to add that we will be happy indeed to welcome Mr.and Mrs. Dodge to sunny California and encourage them in their collection here.

Mrs. E. Morehouse, 23 Queen's Road, Doncaster, Yorkshire,England. " Thank you for the " Minutes of the Conchological Club of Southern California". I think the minutes are a marvelous collection of useful information and just what is wanted. I hope this war will soon be over and we can resume some of our activities as it takes all of my time to carry on. I miss my foreign mail very much. Here is wishing you much successand a great future. I would like a Polymita necklace, and a few specimens. I have a necklace from N.Z. etc."

Perhaps Ted Dranga will see the above. Ted did have about the most gorgeous Polymita ornaments I have ever seen.

Glenn E. Harger, 1332 Menlo Ave., Los Angeles 6, Calif. " Yes. I would be glad to receive the minutes of the club meetings. War time has taken so much time that shell hunting and trading has been held in abeyance. I am enclosing $1.00 to defray part of the mailing expenses. I had hoped that our local society would send us membership cards upon the paying of dues- as set by the society members."

V.C. Cortell, Berry Creek, Calif. " I just completed a two year contract in Pearl Harbor and while there became very interested in shells. On my return a few weeks a go, I wrote to the American Museum of Natural History to Dr. Miner and to Mr. Perry A. Morris of New Haven for names of dealers and in addition to dealers both mentioned your name as with a group of collectors. I knew of you alrwady from Lieutenant Brookshire from Southern California with whom I had made trips in Honolulu....."

We cordially welcome Mr. Cortell and hope that he will find it possible to meet with us and become personally acquainted. He will, of course receive the Minutes.

Mrs. E. Whyte, 58 Campbell Road, Onehunga S-E 5, Auckland, New Zealand. We regret to report that Mrs. Whyte has been having trouble with her eyes and has been unable to do any collecting. " I am sending Mrs. Burch a small broach made from Pana shell. Our returned soldiers make them. They are very nice and I hope she likes it. If at any time you should have a red Spondylus or any spare shells I should be very pleased to receive them. A young soldier from your place used to come to my place when the Americans were camped in New Zealand and I can tell you he was a credit to his mother and father. His name was Charles Koonge and his mothers address is Mrs. George Koonge, 330½ N. Mariposa Ave., Los Angeles. "...

G. Clifford Carl, Office of the Provincial Museum, Victoria, B.C. " I regret we are unable to supply you with a copy of Dall's paper " Notice of some new or interesting species of shells from British Columbia and the adjacent region", Natural History Society of B.C., Bulletin No.2,1897. The only available copy that I know of is in the Provincial Library, this city.

We recently had an inquiry regarding these Bulletins from the Allan Hancock Foundation, the University of Southern California, who, I believe, are arranging to borrow the papers in order to have photostatic copies made. You might enquire of the possibility of getting such a copy through them. It was Miss Irene McCulloch who made the enquiry.

May I compliment you on your recent " Minutes" which we have lately received."

Pfc. Charles B. Lee, 2143 AAFBU, Sq. "A", T.A.A.F. Tuskegee, Alabama. " I have been meaning to break my long cessation of correspondence with you, but there is so much to do for the Army that personal pursuits unfortunately have to be placed in second category.

I have, however, been in receipt of your excellent minutes and as the different issues arrive, I realize more than ever the greatness of their scope. I have recently received a few boxes of shells from California and I hasten to add that the minutes have been of immeasurable help in the identification of the shells from the boxes of drift that I find so interesting.

Last night I removed a small box of the *Epitonium hindsii* from the drift. When viewed under the lens the shells have the same quality of the magnificent *pretiosa*.

My brother in New Guinea has sent a box of shells. Twas good that he chose to send only heavy quality specimens because the box was a sorry affair when it finally arrived here. The beaches are scoured for specimens by the fellows and the G.I. s seem partial to the Cats Eyes. He sent 8 splendid opercula in addition to a *Turbo* that I have not had the opportunity to look up for identification. A few of the *C. annulus* and *intermedia* comprise the lot and that was about all that he was able to send this time. I am hoping for better pickings in the next box.

Some time ago I began to think about the fate of the Calvert Shell Collection that was the rage of the New York conchological world about 6 years ago. In all of the intervening years that I have been to New York City I have been unable to locate a trace of the collection with all of its wonders. So I am asking as a favor that you place a request that any one with knowledge of the collection contact me at the address in Buffalo. I would so like to get at the collection once more. Some of the finest shells I was able to get came from that collection.

In addition would you recommend a good reference book on the shells of the West Coast. I have quite a few and the Josiah Keep that I have published in '95 is not comprehensive enough in scope.

The enclosed stamps are to help with your work. Could you send a few back copies to Professor William P. Alexander, 44 Ravenwood Terrace, Williamsville, New York. I sent him word of the workand he mentioned the fact that he would like to see a few of the copies."

I think we can answer Mr. Lee here. If not available to him perhaps he should purchase the four volumes of Ida Shepard Oldroyd's " The Marine Shells of the West Coast of North America." The price bound in cloth is $10.00.

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MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA- May,1945.

The Conchological Club of Southern California met at the usual time and place Sunday, May 6,1945 at 2:30 P.M.

There were present 16 old members and our two associate members whom we are glad now to have on the active list, Mr. and Mrs. Harry R. Turver,8640 Evergreen Ave., South Gate, Calif.

New active members do not come in very often of late due to war activities and gas shortages.

Some discussion took place but there were no motions made and no reports of committees, so the program of study was taken up, proved unusually interesting, and closing time came all too soon. The discussions on the subject matter studied willl be found elsewhere in the minutes.

Effie M. Clark, Secretary.

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IMPORTANT NOTICE- ***** Before the war we met in the evenings. Due to defense precautions, black outs etc. we began meeting Sunday afternoons. The question now is whether or not to return to meeting in the evenings . There is no doubt that some of the members prefer each time and it is suggested that all active members mail their preference of the meeting time to the editor. In this way we can get a fair statement of opinion from the entire membership.

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Mrs. Lillias F. Cockerill, Sanibel, Florida. " I was astonished to find that Mrs. Schwengel took exception to my statement that I thought many of our shells had been buried by the hurricane. I know that along the front of my beach cottage hollows of several feet deep were filled in and for hundreds of yards the beach is now several feet above the level of the road which crosses our lots between the buildings and the water. Of course, some littoral shells have emerged and have been very good but all winter visitors here agree that the shelling has been the poorest in many years . As to the zic zac Pectens, I do not think any family on the island has found more than a dozen in six months. A large bed of these Pectens was torn up and immediately after the hurricane many washed ashore on beaches south of us but few here. I tried for several months to get in touch with someone who had found a number of them and who was willing to sell, and eventually found a fisherman some 40 miles away who sold me all he had. Now I have a good supply of them but most of the holders if willing to sell at all would only sell one and that without any selection being allowed. A case of $2. and take what you get. Well I am sending you one, but I am afraid you cannot pick it out. I will not make a special selection as to color but will send one without imperfections. I may state that while Dr. Perry and Dr. Maxwell Smith both describe the Pecten zic zac as having a white lower valve many of mine are deeply colored, but are unquestionably zic zac."

MINUTES OF THE LONG BEACH SHELL CLUB- May,1945

The May 13th meeting of the Long Beach Shell Club was called to order by the president, Mr. E.P. Baker, who introduced the visitors. Reports were made of Mrs. Ulrich's exhibit of shells in the Lomita school, of Mr. Baker's First Prize for his shell exhibit at the Downey Kiwanis Club Hobby Show. Mr. Ulrich reported on collecting near Naples.

Dr. H.R. Hill, of the Los Angeles Museum, introduced by Miss Rogers, program chairman, told of the very fine exhibit of minerals and gem stones open to the public in the Museum this month,and then took as his subject " Mollusksand Their Uses."

One of the most important uses of shells isas a hobby, providing rest and relaxation. Many institutionsa re using this hobby for the hospitalized. Australia is employing shell study for soldiers, as is the Birmingham Hospital in Van Nuys. He mentioned a paper written by Dr. Morrill Moore of Harvard, which gives the modern shell classification, tells about each family, and is used in a hospital in Connecticut.

Geologists in the oil industry, by examination of the core in oil drilling, can tell of the presence of oil sand.

Some of the practical uses of shells areas money for buying, trading or exchanging. Some shells so used are the money Cowry of the south Pacific, the tusk and Olivella, and abalaone cut-outs of west coast Indians, and the quahog of the Atlantic. The natives of New Guinea made cut-outs of Spondylus and Glycymeris, and used these to buy a bride, the money value differing according to shape and color. Decorated armlets were traded for necklaces, and these were often handed down in a family.

Dr. Hill showed arm bands, anklets, and head bands from New Guinea and Hawaii. Moonshells were attached to a strip of cocoanut bark. One band which shone like metal was made from the center of the chambered Nautilus of the Philippines. Horse and elephant trapings in India were shell decorated. In New Guinea the pearl oyster was used for a fish hook, a shiny one to attract the fish and a dark one for catching. This dark one was swallowed by the fish. Cypraea mauritiana was also used here, weighted down with a rock to attract the Octopus. A broken Cowry shell served as knife to scrape bread fruit. Cone shells with the top cut off were woven into an ornament of the breast. The Triton's trumpet makes a good horn, while the clam like window pane shells cut square and inserted in a wood frame let light into the natives home.

In our own country the button industry at Muscatine, Iowa, uses river shells, while the south sea mother of pearl provides more beautiful material for the pearl button factory.

On the Gulf of Mexico fences and fence posts may be made of coquina composed of the Donax group cemented together by nature. The crushed Louisiana oyster is used for road work, and at Santa Margarita the fossil Ostrea titan is mined and crushed for chicken feed and fertilizer.

The animal inside the shell is often a source of food, important ones being the clam, abalone, oyster, and mussel. Helix aspersa and pomacea, raised in snaileries in Europe, are fattened on grain and used especially during lent. The south African Acatina in its six inch long shell, is roasted in the fire and makes a satisfying morsel. Shell fish in our state are protected by law to prevent their destruction.

Another early use of shells in the days of Tyre and Sidon, was for the purple dyes used in the robes of Roman emperors. Holes in rocks along the coast where the Murex branderis was crushed to produce the dye retained both the purple color, and the accompanying odor. Purpura patula has been used by the native Mexicans. The ladder, or wandletrap,and the pelagic purple snail give off color. When questioned as to the use of the Octopus for this purpose, Dr. Hill mentioned Miss Fossler of U.S.C. having experimented with the fluid of the sea hareand having obtained satisfactory results with it as a silk dye, but was unfamiliar with the methods used.

Italy and India have produced sepia for painting and drawing from the squid.

One of the last mentioned uses of shells was for jewelry, and Dr. Hill told us that the helmet and conch shells of Florida were sent to Italy where the Italians carved them into beautiful pieces brought back by soldiers in the first world war. And nowservice men are spending empty hours inthe southseas gathering opercula of turban shells called cat's eyes and sending them back home as souvenirs.

And last but not least especially in value isanother production of the Italians, the Tarantine silk made by a special process from the long golden brown strands which the two to three foot long Pinna uses to anchor itself. This silk was made into gloves, capes, and scarfs.

In closing his talk, Dr. Hill suggested getting this week's Colliers which contains an article on submarine life by Wm. Beebe, and Mrs? Baker suggested the last Nature magazine.

The Long Beach club appreciated the talk, especially so, since it is to hard to getabout these days.

Shells from Dr. Lyman were shown by members and a pearl pin and pearl in an oyster artificially produced by the Japanese Mikimato were shown by Miss Rogers before adjournment of the meeting.

Ruth E. Eaton, Secretary.

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Harold Harry, now serving with the U.S. Navy dropped in for an evening last week. His ship was just back from the real thing in the far Pacific and he had some interesting things to talk about. He brought with him a bag full of shells and we had quitea time classifying them. Among other things of interest was a box full of the huge Achatina fulica Fer. (recall our articles awhile back about the rubber eating pest of Malaya ?). Apparently our rubber eating friend finds banana plants to his taste also because Harry said that they were present on Saipan in vast numbers under every banana leaf. We hope that he will write us an article about some of his other experiences.

Carlyn Halde, 907 S. Walnut, Inglewood, Calif. This is our member's new address.

Mrs. Gray Hackney, " Will you please send my Minutes from June 9 to Sept.4 to Atlantic Beach, N. Carolina. L'm looking forward with enthusiasm to a b busy summer, and will be glad to send Tom as many radulae as I can, in the hope that there will be some among them that he does not have."

Dr. W.P. Woodring, United States Department of the Interior, Geological Survey, Geology Department, University of California at Los Angeles, Los Angeles 24, California. " I am enclosing a check for $10.00. Kindly place my name on the mailing list for the Proceedings of the Conchological Club of Southern Calif . and kindly send me, if available, an assembled copy of " Distributional List of the West American Marine Mollusks from San Diego, California to the Polar Sea, Part 1, Pelecypoda."

Your Proceedingsand Distributional List are very valuable contributions and you are to be congratulated on your energy and perseverence in getting them out during these troublesome times.

At the present time I am at a temporary office of the U.S. Geological Survey in the Geology Department at U.C.L.A. "

University of Virginia, Charlottesville, Virginia, Alderman Library.

We are pleased to add the above name to our mailing list.

CORRECTIONS AND ADDITIONS

Minutes # 46, p. 13 - Dentalium splendidum G.B. Sowerby,1832. Mr. George Willett advises " Dr. Pilsbry has confirmed my identification of 5 specimens of D. splendidum Sby. from Los Coronados. He states they are smaller than the type, but indistinguishable from smaller specimens". The result of this is the definite addition of this species to our faunal list.
Minutes # 46 p 12- Dentalium pretiosum Sowerby, 1860. Mr. George Willett advises " The range of D. pretiosum should read " Sitka, Alaska to San Diego. Sitka is considerably further north than Forrester Island.
Minutes # 46 p 15- Cadulus aberrans Whiteaves,1887. Mr. George Willett notes " After studying my northern Cadulus , using your key and figures, it seems probable that I have confused hepburni and aberrans, and that all my records of the former should apply to the latter.

Nuculana austini (Oldroyd),1935. Nautilus vol. 49, p. 13. This species was omited from our faunal list on the assumption that it is in the synonymy of N. minuta Fabricius,1776. Mr. A.M. Strong has a set labelled austini from 100 fathoms off Gabriola Pass. If Mr. Strong's specimens are true N. austini it is at once obvious that the species is not minuta. The Strong specimens are much more elongate. They are close to the specimens we have labelled N. minuta lomaensis Dall,1919. Mr. George Willett advises that austini is a good species in his opinion. Therefore we are returning this species to our list of west coast species of Nuculana.

Dr. A. Myra Keen comments on the species as follows " It may be that Nuculana austini Oldroyd is valid. The Stanford collection probably has enough dredged material from the Puget Sound area to answer the question if anyone ever has time to sit downand study it. Until then, perhaps it would be well to enter the name on the list tentatively."

Minutes #40 pp 15,16 Rochefortia pedroana Dall,1899. The following note was received some time ago from Mr. W.K. Emerson of San Diego " I find in the current Minutes an interesting account of finding on Blepharopoda occidentalis Randall a Rochefortia species. I collected species resembling your description on this sand crab at Pacific Beach, San Diego county. In 1940, they were common on the crustaceans near the Crystal Pier. Other B. occidentalis sps. examined near Mission Beach, Calif. possessed no shells attached to them. My specimens are white, with wrinkled, tan colored epidermis. I also have one complete Rochefortia sp. taken in sand at Coronado which is altogether differentm and not identified. I understand Miss Wilson has also collected R. pedroana from sand crabs from La Jolla, Calif."

This is an extension of our range for this species southward from San Pedro to San Diego.

Minutes # 43 p 21- Gari californica (Conrad),1848. Bainbridge Island, Kitsap Co., Wash. July,1944 (W.J. Eyerdam)
Minutes # 43 p 22. Heterodonax bimaculata L. Corinto, Nicaragua, La Union, Salvador... Gulf of Fonseca,Honduras.. (W.J. Eyerdam,[illegible]-39).
Minutes # 43 p 22- Sanguinolaria nuttallii Conrad Many specimens from Mission Bay reported by Mr. W.K. Emerson.

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA

June 1945

These papers are published by a group of interested students for our own pleasure and financed by voluntary contributions of members and friends. It is not our intention to offer subscriptions and guarantee regular periodical publication. However, non members of our club will be placed on our mailing list and receive all papers published for contributions to our fund of $2.50 per year or $1.25 each six months.

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Our next meeting will be held July 1, at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. at 2:30 P.M.

We are now meeting the first sunday of each month.

Please mail all news about shells, shell publications, shell collectors, shell trips, localities etc. to your editor,

John Q. Burch,
4206 Halldale Ave.,
Los Angeles 37, Calif.

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It is our intention to print a final report on our work when we have covered every group. In the meantime we are eager to get all information possible. Members and friends are urged to write in their experiences and opinions, and what is even more important advise us when they think we are in error.

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NOTICE- Before the war we met in the evenings. Due to defense precautions, black outs etc. we began meeting Sunday afternoons. The question now is whether or not to return to meeting in the evenings. There is no doubt that some of the members prefer each time and it is suggested that all active members mail their preference of the meeting time to the editor. In this way we can get a fair expression of opinion from the entire membership.

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We still have on hand a few copies of our Distributional List, Part I, Pelecypoda for which we are asking $5.00 to our fund.

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Occasional Papers on Mollusks, published by The Department of Mollusks, Museum of Comparative Zoology, Harvard University, Cambridge, Mass. Number 2, April 30,1945 by R.T. Abbott " The Philippine Intermediate Snail Host (Schistosomophora quadrasi) of Schistosomiasis", 11 pages, 5 plates.

Lieutenant Abbott has written a very detailed study of a species which is the source of unusual interest at this time.

California Fish and Game, Vol.31, No.2, April,1945 has been received.

Frank Lyman's " Shell Notes" No. 12 has been received. Members not already on Frank's mailing list should write to Frank Lyman, Drawer 1412, Lantana, Florida.

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Family CANCELLARIIDAE

The following data is taken from the notebook of Mr. A.M. Strong.

Genus,subgenus, and section names mentioned in west coast records.

Cancellaria Lamarck, Lamarck,1799 Vide Grant and Gale the type is Voluta reticulata Linne (by monotypy). Woodring gives the same type. West Indies. Thiele gives the type as C. cancellata Linne.

Merica H. & A. Adams. Grant and Gale list as a synonym of Cancellaria s.s. Thiele lists as a section of Cancellaria s.s. and gives type C. melanostoma Sby. Dall gives same type and lists several west coast species in Bull. Mus. Comp. Zool. ? is can be used for them.

Euclia H. & A. Adams. Grant and Gale list as a synonym of Cancellaria s.s. Thiele as a section of Cancellaria s.s. and gives type C. solida Sby. a west coast shell. Cossmann gives type as C. cassidiformis Sby. also a west coast shell.

Narona H. & A. Adams. Grant and Gale give type as C. clavatula Sby. (by subsequent designation Cossmann), a west coast shell. Thiele lists it as a subgenus and gives the same type. Dall, Bull. Mus. Comp. Zool. gives the type as C. mitraeformis Sowerby, not Brocchi. Sowerby describes C. mitriformis, a west coast shell. C. mitraeformis is an older name and vide Thiele is the type of the section Brocchina Jouss.

Aphere H. & A. Adams,1854. Grant and Gale list as ? synonym of Cancellaria s.s. Thiele lists it as a subgenus. Type (by monotypy) C. tessellata Sowerby, a w est coast species.

Progabbia Dall. Grant and Gale list it as a synonym of Narona H. & A. Adams. Thiele lists as a section under Narona. If the subsequent designation of C. clavatula is correct it is entirely distinct from Narona. If C. mitriformis is used for the type of Narona there is not much difference. Both are west coast species. If C. cassidiformis Sby. is the type of Euclia, Progabbia is same.

Massyla H. & A. Adams,1854. Not mentioned by Grant and Gale or by Woodring. Thiele lists as a section under Aphere. Type (by monotypy), C.corrugata Hinds, a west coast species.

Crawfordiana Dall. described by Dall as a section under Progabbia. Grant and Gale list it as a section under Cancellaria s.s. Thiele lists it as a section under Narona. Type (by original designation), C. crawfordiana Dall.

Trigonostoma Blainville,1826. Thiele lists as a subgenus and gives as the type C. trigonostoma Deshayes. Woodring gives the type (by monotypy), Delphinula trigonostoma Lamarck. Grant and Gale list (p.622),Trigona Perry,1811, type T. pellucida Perry equal C. trigonostomia Lamarck , not Trigonia Megerle,1811. Type an Indo-Pacific shell and some west coast species certainly belong here.

Bivetopsia Jouss. Thiele lists as a synonym os Cancellaria s.s. Woodring gives the type (by subsequent designation, Cossmann), C. chrysotoma Sowerby, a west coast shell. (Has the wide umbilicus of Trigonostoma.

Sveltella Cossmann. Thiele lists as a section of Narona and gives type as parva Phil. (Not the type in Cossmann, p. 29).

Sveltia Jouss. Used by Dall in Bull. 112, Type Jouss P. 20 C. varicosa Pliocene.

Cossmann's arrangement, Ess. Paleo. Corp., vol.3,1899.
Cancellaria Type, reticulata Linne)(p. 10).
Aperture without canal, deeply indented, with siphonal fasciole.
Cancellaria
Not turrited, 3 plicate
Cancellaria s.s.
Outer lip dentate
Narona Type C. clavatula Sby. (p.5).
Merica Type C. melanostoma Sowerby (asperella Lam.) (p. 10)
Aperture without canal, with siphonal fasciole
Merica Not turrited
Merica s.s. Plications oblique
Aphere Type C. tessellata Sby. (p. 17)
Siphonal fasciole obsolete
Trigonostoma Type, C. trigonostoma Desh. in Lam. (p.24)
Umbilicate.
Trigonostoma Aperture trigonal
Trigonostoma 3 plicate
Admete Kroyer,1842. Type A. viridula Fab. (p.31)
Not umbilicate, without siphonal fasciole, 3 plications
Admete s.s.
Benthobia
Massyla Type, C. corrugata Hinds (p.39)
2 elongate plications.
Massyla Fusiform.
(Bivetopsia Jouss. is listed as a synonym of Bivetia Jouss. The type of the Bivetopsia is stated to be C. chrysostoma Sby. (p.8))
Euclia is listed as a synonym of Cancellaria s.s. and the type is stated to be C. cassidiformis Sby.

Thiele p. 352
Genus Cancellaria
Section Cancellaria (Syh. Buccinella Perry,1811- Plicaria Fabricius 1823- Bivetia Jouss.,1887- Bivetopsia Jouss.)
Type C. cancellata Linne.
Section Euclia H. & A. Adams,1854. (Syn. Heteroculia Roesoti,1899)
Type C. solida Sby.
Section Merica H. & A. Adams,1854. Type, C. melanostoma Sowerby.
Subgenus Trigonostoma Blainville,1826
Section Trigonostomia s.s. Type, C. trigonostoma Deshayes
Section Ventrila Jouss. Type, C. ventrilia Jouss.
Subgenus Narona H. & A. Adams,1854. Type. C. clavatula Sowerby.
Section Sveltella Cossmann,1889. Type C. philippi Cossmann-parva Phil.
Section Tribia Jouss. Type. C. angasi Cross.
Section Solatia Jouss. Type. C. piscatoria Gmelin.
Section Mericella n. sec. Type. C. jucunda Thiele.
Section Microsveltia Iredale,1925. Type. C. rocess Iredale.
Section Brocchina Jouss.,1887. Type. C. mitraeformis Brocchi.
Section Progabbia Dall,1918. Type. C. cooperi Gabb.
Section Crawfordiana Dall,1918. Type C. crawfprdiana Dall.
Subgenus Aphere H. & A. Adams/
Section Aphere s.s. Type C. tessellata Sowerby.
Section Massyla H. & A. Adams,1854. Type C. corrugata Hinds.
Genus Admete Type. A. viridula Fab.

Family CANCELLARIIDAE

Key to west coast genera and subgenera

Columella straight, with from one to three plications.
. A well developed siphonal fasciole and a stromboid notch present
.. Umbilicus covered or reduced to a narrow chink.... Cancellaria
... Varices absent
.... Axial ribs not spinous at the shoulder of the whorls (Cancellaria)
.... Axial ribs rising to short spines at the shoulder ... (Euclia)
... Irregularly placed varices present ....(Narona)
.. Umbilicus open,rather narrow,bounded by the fasciole .. Bivetopsia
.. Umbilicus wide,funnel shaped, aperture triangular ..... Trigonostomia
. Siphonal fasciole feeble or obsolete, plaits small, oblique Massyla
..Shell slender,apex pointed, body with a slight callus .... (Massyla)
.. Shell cylindrical or ovate, body callus strong and wide .. (Aphera)
Columella curved, plaits faint or obsolete .... Admete

Perhaps we should call attention here to some very interesting changes in nomenclature. We are accepting the classification of Mr. A.M. Strong which will be discussed at length below. However, a brief summary of the changes involved follow. Mr. Strong lists but one species under the genus Cancellaria and that is C. cooperi Gabb which is placed under the subgenus Euclia H. & A. Adams. Mr. Strong uses as a genus, Massyla H. & A. Adams, under which he places the species io and corbicula (under subgenus Aphera H. & A, Adams.), crawfordiana (under Massyla s.s.), and also under Massyla s.s. he places the species modesta,unalaskensis, and circumcincta; and also places the following species (under the genus Admete by Dall) in Massyla s.s., rhyssa, gracilior, woodworthi; and the species of Admete by Dall placed under Massyla, subgenus Aphera are californica and microsoma. Mr. Strong retains under the genus Admete only the following species: couthouyi, couthouyi laevior,middendorffiana, and undata.

Genus Cancellaria Lamarck,1799. Type (by monotypy), Voluta retic-ulata Linnaeus, Recent, Florida and West Indies, figured by Sowerby in Thes. Conch., vol.2, Cancellaria,1849, pl.92,fig.17.

" Shell oval, variously sculptured or smooth; last whorl ventricose; aperture with a short canal; columella straight,with two distinct folds and terminating with a third, plate-like fold. There is a well developed siphonal fasciole which covers the umbilicus or reduces it to a narrow chink at certain stages of growth and the outer lip shows a shallow stromboid notch, varying in depth with the stages of growth."

Subgenus Cancellaria s.s.

" Sculpture reticulate, either on the spire or over the entire surface, without varices, the intersections of the axial ribs and spiral cords usually forming rounded nodules but not spinous"

Cancellaria s.s. is not represented in the California fauna, but there are a number of species inthe southern fauna which will be listed on the next page and followed by Mr. Strong's key to species.

West Coast Species of Cancellaria s.s.

Cancellaria obesa Sowerby,1832. (Cerros Island to Peru)
Cancellaria ovata Sowerby,1832. (Ecuador)
Cancellaria solida Sowerby,1832. (Gulf of California to Peru)

Cancellaria bulbula Sowerby,1832. (Corinto)
Cancellaria decussata Sowerby,1832. (Cerros Island to Peru)
Cancellaria ventricosa Hinds,1843. (Magdalena Bay to Central America)
Cancellaria albida Hinds,1843. (West Mexico to Ecuador)
Cancellaria indentata Sowerby,1832. (West Mexico to Panama)
Cancellaria cremata Hinds,1843. (West Mexico to Central America)
Cancellaria urceolata Hinds,1843. (Magdalena Bay to Panama)
Cancellaria gemmulata Sowerby,1832. (Gulf of Calif. to Galapagos)
Cancellaria acuminata Sowerby,1832. (Central America)
Cancellaria peruviana Strong and Hertlein (Peru)
Cancellaria buccinoides Sowerby,1832. (Nicaragua to Chile)
Cancellaria balboae Pilsbry,1931. (Panama)
Cancellaria elata Hinds,1843. (Panama)

Key to the West Coast Species in the Subgenus Cancellaria s.s.
Sculpture faint or obsolete on the body whorl
. Columella short, upper plait very strong
.. Body whorl somewhat cylindrical
Length 45, diameter 25 mm .... obesa
.. Body whorl tapering anteriorly
Length 35, diameter 20 mm .... ovata
. Columella longer, plaits oblique
.. Body whorl smooth, polished
Length 40, diameter 30 mm .... solida
.. Body whorl with faint axial sculpture
Length 30, diameter 20 mm .... bulbula
Reticulate sculpture extending over the entire surface
. Axial ribs and spiral cords equal in strength and spacing
.. Whorls rounded, not shouldered
Length 40, diameter 20 mm .... decussata
.. Whorls narrowly, roundly shouldered
... Shell ovate, orange brown
Lenth 30, diameter .... ventricosa
... Shell slender, white
Length 25, diameter .... albida
.. Whorls sharply, flatly shouldered
... Axial ribs close spaced, about 20 on the body whorl
Length 25, diameter 15 mm .... indentata
... Axial ribs wide spaced, about 12 on the body whorl
Length 20, diameter .... crenata
. Axial ribs stronger than the spiral cords
.. Body whorl flattened on the sides
Length 35, diameter .... urceolata
.. Body whorl well rounded, not shouldered
... Shell thick, with coarse sculpture
Length 25, diameter 15 mm .... gemmulata
... Shell comparatively thin, with fine sculpture
.... Axial ribs close spaced
Length 25, diameter 14 mm .... acuminata
.... Axial ribs wide spaced .... peruviana
.. Body whorl angularly shouldered
... Shoulder narrow, sloping
Length 40, diameter 25 mm .... buccinoides
... Shoulder wide, flattly sloping
Length 45, diameter 21 mm .... balboae
... Shoulder wide, almost tabulate length 20 .... elata

Subgenus Euclia H. & A. Adams,1854. Type (by subsequent designation, Cossmann,1903), Cancellaria cassidiformis Sowerby, living, west coast of America. Progabbia Dall,1919 is in the synonymy.

" Shell pyriform, not umbilicated; spire very short, whorls smooth; columella with strong, anterior plaits" (Adams).

Mr. A.M. Strong discusses this subgenus " H. and A. Adams listed four species under Euclia. Cossmann in 1899 seems to have been the first to designate the type. Dall considered the first species in the original list, C. solida Sowerby, was the type. Some of the characters of the two species are quite different, but the similarity of C. cassidiformis to C. cooperi makes Dall's new subgenus unnecessary.

Dall evidently intended to include a number of west coast species in his subgenus Progabbia as he states;" I have come to the conclusion that the California species of the genus Cancellaria, in its wider sense can not properly be included in any of the groups into which it has hitherto been divided." As he only gives the type and lists no other species under his new subgenus there is no way of knowing what he considered to be the distinguishing characters. As here used the subgenus Euclia in the west coast fauna is restricted to two species, characterized by having wide spaced axial ribs rising to spines at the shoulder of the whorls."

Key to the west coast species in the subgenus Euclia

Shell broad, somewhat pyriform
  Length 60, diameter 40 mm .... cassidiformis
Shell slender, somewhat fusiform
  Length 80, diameter 35 mm .... cooperi

Cancellaria (Euclia) cooperi Gabb,1865. Monterey, Calif. to Coronado Islands (Dall). Dr. A. Myra Keen advises " Gabb cites specimens of C. cooperi from both San Diego and Monterey. Until the holotype is detected, possibly at the University of California, the type locality is uncertain".

Mr. A.M. Strong notes " This is the largest of the west coast Cancellariidae. The shell is elongate, slopingly shouldered; axial sculpture of about 15 ribs, stong on the spire, becoming faint on the body whorl but rising to small, sharp spines or tubercles on the shoulder angle; spiral sculpture of fine, close spaced cords. The color is brownish with narrow, darker lines. Oldroyd gives the measurements as, long. 80; diameter of the body whorl, 35 mm."

Collecting data: Dredged off Redondo Beach, Calif. in 35 fms., mud bottom, off El Segundo, Calif. and off Monterey in 40 fms. (Burch); off Monterey, 15-300 fathoms, in mud; rare. You already have my note on getting them on set lines. This species evidently grows quite large in the Bay. I once saw a specimen 7 or 8 inches long among some shells collected years ago by Miss I.F. Deming, of Pacific Grove (A. G. Smith); Newport,Calif. (H.N. Lowe); Redondo (Chaney); Point Loma- 1 fair sized and 1 young dredged (Gripp); So. Coronado Island, 1 dead specimen dredged (Dr. F. Baker).

Subgenus Narona H. & A. Adams. Type (by subsequent designation, Cossmann), Cancellaria clavatula Sowerby, living, west coast of America.

Mr. A.M. Strong discusses this subgenus as follows : " H. & A. Adams included a number of species under Narona. Of these Cossmann designated C. clavatula as the type and this seems to have been the first definite statement of a type. Dall and others have considered Cancellaria mitri-

-formis Sowerby to be the type and have grouped a number of the slender mitra-like species under the name. Narona, as represented by the type, differs from all other groups in Cancellariidae in the presence of irregularly placed varices. The shell is rather slender, not umbilicate, the siphonal fasciole not prominent and the columellar plaits strong. As here used only the two varicose species occuring in the west coast fauna are considered to belong to the subgenus."

Cancellaria (Narona) clavatula Sowerby,1832. (Gulf of Calif. to Peru).
Cancellaria (Narona) exopleura Dall,1908. (Central America to Peru).

Axial ribs strong, about 15 appearing on the body whorl ... clavatula
Axial ribs low, sharp, numerous .... exopleura

Genus Bivetopsia Jousseame,1887. La Naturaliste, ser. 2, year 9, p. 193. Type (by subsequent designation, Cossmann) Cancellaria chrysostoma Sowerby, living, west coast of America.

This genus is not represented in the California fauna, but there are a number of species in the southern fauna. Mr. A.M. Stromg's discussion and keys follow: The group, here placed in a separate genus with C. chrysostoma Sowerby as the type, is quite distinct in the west coast fauna. They are characterized by a narrow, open, deep umbilicus bounded by a distinct siphonal fasciole. All are subglobose to broadly turrited shells with well developed sculpture and are confined to tropical or sub-tropical waters. As in typical Cancellaria the columella has two strong plaits and ends in a plait like fold."

Bivetopsia funiculata (Hinds),1843. (Gulf of Calif. to West Mexico)
Bivetopsia chrysostoma (Sowerby),1832. (Panama to Peru)
Bivetopsia haemastoma (Sowerby),1832. (Galapagos)
Bivetopsia brevis (Sowerby),1832. (Gulf of California to Ecuador)
Bivetopsia pulchra (Sowerby),1852. (Central America to Ecuador)
Bivetopsia centrota (Dall),1896. (Gulf of Calif. to Cocos Island)
Bivetopsia cumingiana (Petit),1844. (Peru)
Bivetopsia tuberculosa (Sowerby),1832. (Peru to Chile)
Bivetopsia bullata (Sowerby),1832. (Cerros Island to Panama).

Key to species of the genus Bivetopsia
Axial ribs strong, not spinous
. Shell subglobose
.. Spiral cords broad, strong
Length 37, breadth 20 mm .... chrysostoma
.. Spiral cords fine, alternating in strength
Length 27, breadth 17 mm .... haemastoma
.. Spiral sculpture obsolete
Length 20, breadth 15 mm .... brevis
. Shell broadly turrited
Length 20 mm .... funiculata
Axial ribs spinous at the intersection with the spiral cords
. Intersections forming raised, angular points
Length 28, breadth 20 mm .... pulchra
. Shoulder pf whorls with long, guttered spines
Length 35, breadth 20 mm .... centrota
Axial ribs indistinct or obsolete
. Spiral sculpture of deep grooves .... cumingiana
. Shoulder and periphery with spiral rows of nodes
.. Nodes on the shoulder axially elongate
Length 35, breadth 27 mm .... tuberculata

.. Nodes at the shoulder spirally elongate
Length 30, breadth 25 mm .... bullata

Genus Trigonostomia Blainville,1826. Mem. de Conch.,1826, p.652. Type (by monotypy), Delphinula trigonostomia Desh. in Lam., figured in Reeve, Conch. Ic. Cancellaria, vol. 10, pl. 11, fig.51.

Mr. Strong notes " Trigona pellucida Perry is very similar to, if not identical with Delphinula trigonostomia Lamarck and both come from the same general locality. The use of Blainville's name may be open to question as it is considered by some to be a vernacular name. However, it has been used by many writers on conchology and paleontology.

The type is a loosely coiled shell with broadly, concavely, tabulated whorls,forming a triangular aperture. The siphonal fasciole is represented only by a ridge bordering the wide, funnel shaped umbilicus and the columella has two low plaits and an obscure basal fold."

This genus is not represented in the California fauna and the only species known from the west coast is the following from the southern range.

Trigonostomia goniostoma (Sowerby),1832. (Gulf of Calif. to Panama).

Genus Massyla H. & A. Adams,1854. Gen. Rec. Moll., vol.1,1854, p. 278. Type (by monotypy) Cancellaria corrugata Hinds, living, west coast of America. The following note from Dr. A. Myra Keen " The type of Massyla is by monotypy. As to recognizing this as a genus and reallocating species to it previously placed by Dall in Sveltia,I believe Mr. Strong is justified. ... The type of Sveltia is a European fossil species, of Massyla a Recent West American form."

Mr. A.M. Strong discusses the genus as follows: " The species in this genus differ from those in Cancellaria and Bivetopsia in that the siphonal fasciole and stromboid notch is faint or absent and the plaits on the columella are fine and very oblique. The lower end of the columella in some of the species is cut off obliquely with a very faint or no terminal plait."

" Shell ovate, turbinate; spire obtuse, whorls transversely striated; aperture contracted and emarginate anteriorly; columella truncate"(Adams).

Subgenus Massyla s.s.

" In the typical subgenus the shells are slender and have a more or less well defined canal. The enamel of the inner lip over the body of the shell is narrow or absent, and the umbilicus is covered or reduced to a narrow chink. With the exception of the type all the west coast species placed in the subgenus are known to range into cool waters, Peru and Chile on the south and from California to Alaska on the north."(Strong)

The following list of species covers the entire coast and will be followed by Mr. A.M. Strong's key to species. We will then take up a more detailed discussion of the species reported from San Diego northward.

Massyla (Massyla) corrugata (Hinds),1843. (Ecuador)
Massyla (Massyla) crawfordiana (Dall),1891. (Drakes Bay to San Diego)
Massyla (Massyla) philippi (Cossmann),1899. (Chile)
Massyla (Massyla) mitriformis Sowerby,1832. (Panama to Peru)
Massyla (Massyla) uniplicata (Sowerby),1832. (Acapulco to Chile)
Massyla (Massyla) unalaskensis (Dall),1873.(Unalaska to Cape Blanco,Ore.)
Massyla (Massyla) circumcincta (Dall),1873. (Alaska)
Massyla (Massyla) modesta (Carpenter),1863. (Aleutian Islands to Puget Snd

Massyla (Massyla) rhyssa (Dall),1919. (Santa Rosa Id. to Todos Santos B
Massyla (Massyla) gracilior (Carpenter),1866. (Alaska to San Diego)
Massyla (Massyla) woodworthi (Dall),1905. (Monterey).

Key to the west coast species in the genus Massyla s.s.

Adult shell over 10 mm in length
. Sculpture decussated with axial ribs and spiral cords
.. Whorls rounded or slightly shouldered
... Spiral cords numerous, slightly nodulous
Length 12 mm .... corrugata
... Spiral cords numerous, flat topped
Length 43, diameter 21 mm .... crawfordiana
... Spiral cords on spire 3, on last whorl 6 .... philippi
.. Whorls strongly shouldered
... Aperture ending in a distinct canal
Length 45, diameter 17.5 mm .... mitriformis
... Aperture ending in a sharp notch
Length 20, diameter 9 mm .... uniplicata
. Sculpture of strong spiral cords and short, nodulous axial ribs. Length 20, diameter 7.5 mm .... unalaskensis
. Sculpture of spiral cords and faint axial riblets
Length 20, diameter 9 mm .... circumcincta
. Sculpture of spiral cords and fine lines of growth
Length 17, diameter 8.5 mm .... modesta
Adult shell less than 10 mm in length
. Sculpture decussated with axial ribs and spiral cords
.. Axial ribs 12, narrow, nearly vertical
Length 7, diameter 4.5.mm .... rhyssa
.. Axial ribs 10, strong, rounded
Length 9, diameter 4 mm .... gracilior
. Sculpture of spiral cords and faint axial riblets
Length 9, diameter 4.5 mm .... woodworthi

Massyla (Massyla) crawfordiana (Dall),1891. Drakes Bay to San Diego. Type locality, Drakes Bay near San Francisco. Ext. to Forrester Id.,Alaska.

Dr. Dall described a section Crawfordina Dall,1918 with type C. crawfordiana. This was followed by Grant and Gale, p. 614 and others.

" Shell slender, with moderately rounded whorls, which, when fresh, are covered with a coarse epidermis. The sculpture consists of from 15 to 20 axial ribs crossed by numerous flat topped spiral cords. The columella has two slender plaits and an obscure terminal plait. In the original description the color is given as pale brown and the measurements as Long. of shell 43, Max. diameter 21 mm." (Strong).

Collecting data: Dredged off Redondo Beach, Calif. in 50 fms., mud bottom but rare having brought it up twice in seven years of dredging. (Burch); Forrester Island, Alaska in 50 fms. (Willett); off Monterey, Calif. 50-70 fathoms, in mud scarce. Also 46 fms. in fine dark green sand off the Farallone Ids. (USBC Sta. 5789); 14 specimens. Taken off the Mendocino Co. coast (A.G. Smith); San Diego, Calif. 1 specimen from 50 fms. (Kelsey); San Pedro (Oldroyd); Monterey (Oliver); Drakes Bay (Arnheim).

Massyla (Massyla) unalaskensis (Dall),1873. Unalaska to Cape Blanco, Oregon. Type locality, 85 fathoms in Captain's Harbor,Unalaska, Aleutian Islands.

Dr. Dall placed this species and the following two under the subgenus

Sveltia Jousseaume,1888 .

Grant and Gale place this in the genus Admete and state that it may be the young of Admete modesta Carpenter.

"The shell is slender, whitish, with a nut-brown epidermis, sculptured with strong spiral cords of which the posterior three are crossed by short axial ribs, nodulous at the intersections. The columella has two or three oblique plications. The measurements are given as, Long. 0.75, Lat. o.3 ins. (approximately 20 x 7.5 mm.)

Collecting data: Topotypes collected from Captain's Harbor, Unalaska Island, Aleutians in 25 fm s,1932 and Victória, B.C. in 20 fms. (W.J. Eyerdam).

Massyla (Massyla) circumcincta (Dall),1873. Unalaska to Departure Bay, B.C. (H.N. Lowe Coll.). The type locality is stated in Oldroyd to be Popoff Strait, Shumagin Islands, but Dr. A. Myra Keen advises (Per. Comm. April,1945) " The type locality of M. circumcincta was not specified in the original, nor was it given in connection with illustration of the holotype."

" The shell is rose pink, thin and slender, sculptured with strong spiral cords crossed by faint, irregular, axial riblets on the upper whorls. The columella has two or three faint plications. The measurements of the type are given as, Long. .82, lat. .37 ins. (approximately 20 x 9 mm" (Strong).

Collecting data: Izhut Bay, Afognak Island, Alaska, 1922 (W.J. Eyerdam); Departure Bay, B.C. (H.N. Lowe Coll. in the San Diego Museum of Natural History).

Massyla (Massyla) modesta (Carpenter),1865. Aleutian Islands to Puget Sound. Type locality, Neah Bay, Wash.

Grant and Gale,1931, pp. 622,623 consider this species under the genus Admete and suggest that unalaskensis is the young of this species, and that gracilior is a variety of it. This has not been generally accepted.

" There is no figure of a typical specimen of this species and the identification of the fossil specimen is questionable. The shell is described as rather slender, reddish; whorls rounded, sculptured with spiral cords and fine lines of growth; the columella having two plaits and a minute basal plait. The measurements are given as Long. .68, lat. .34 ins. (approximately 17 x 8.5 mm)" (Strong)

Collecting data: Forrester Island, Craig, Ketchikan, Alaska in 15-40 fms. (G. Willett); Frederick Sound, Alaska in 12 fms. (Lewis); San Juan Islands, Str. of Juan de Fuca in 50 fms. (W.J. Eyerdam)(March,1927); our specimens of this species were dredged in Puget Sound by Professor Trevor Kincaid (Burch). There is a set in the San Diego Museum of Natural History labelled from off San Clemente Island by Wardwell. If this identification can be verified it is a great extension of the range southward.

Massyla (Massyla) rhyssa (Dall), 1919. Point Pinos, Calif. (A.G. Smith) to Todos Santos Bay, Lower Calif. (Burch). The type locality is: Off South Coronado Island, 55-155 fms. on the advice of Dr. A. Myra Keen.

This species was listed by Dr. Dall and others under the genus Admete. A note from Mr. George Willett on this species " Whorls rounded; axials (in adults) 14-15".

This small, unfigured species is sculptured with about 12,narrow, axial ribs crossed by a few prominent spiral threads, somewhat nodose at the intersections. The columella has three oblique plaits. In the original description the measurements are given as , Height of shell 7, diameter 4.5 mm. " (Strong).

Collecting data: Abundant in dredgings off Redondo Beach in around 75 fathoms, mud bottom. However, we dredged it in as shallow as 20 fms. off Point Vicente, 40 fms. off Rocky Point, 50 fms. off Ensenada,Mex.(Burch); 65-71 fms. off Point Pinos, in green mud and sand; rare (A.G. Smith); Catalina Island, Calif. in 30 fms. (G. Willett); off Whites Point, Los Angeles County, Calif. (A.M. Strong);

Massyla (Massyla) gracilior (Carpenter),1866. Aleutian Islands to San Diego. Type locality, Santa Barbara Pliocene.

Mr. George Willett gives one note on this species " Whorls tabulated; azials (in adults) 12".

There has been a great deal of confusion and misidentification with this species. We identified some of our deep water specimens from off Redondo Beach as this species but were advised by Mr. Willett and Mr. Strong thatwe were in error. The only set we have so labelled in our collection at this time was dredged in Puget Sound,off the San Juan Islands by Trevor Kincaid. (Burch). The species is described as having a subquadrate aperture and a general resemblance to *modesta*. Grant and Gale state that " the true *gracilis* Carpenter in Gabb is probably a variety of *modesta*." Mr. A.M. Strong states that the *gracilior* group certainly does not belong in *Admete*, and suggests that perhaps these and *modesta* should be listed in a new genus. The occurance of this species in the living fauna has been questioned. The possibility that *rhyssa* and *gracilior* may intergrade making *rhyssa* a synonym of *gracilior* has been suggested. The species was unfigured giving reason to the variety of opinions as to just what it is. Mr. George Willett suggests that the slight fifferences in shape of this species and *rhyssa* may be sexual, a matter about which no one seems to know. From C.A.S. 165, Oligocene or lower Miocene of Oregon, *A. clatskaniensis* Anderson and Martin is said by Dr. Hertlein to be similar. Mr. Strong comments on this that while it is true that they are very close it does not seem probable although not impossible that a shell of this kind would live from the lower Miocene to the present without change.

" Examination of a good series from the Santa Barbara Pleistocene, at points certainly very neat the type locality show that it is a quite distinct species. The shell is rather slender with well rounded whorls, sculptured with about 10 strong axial ribs crossed by a few fine spiral cords. The columella has two oblique plaits and an indistinct basal plait. In the original description the measurements are given as, Long. .35, lat. .16 in. (approximately 9 x 4 mm)." (Strong).

It is obvious that we are badly in need of further information on this species.

Collecting data: Catalina Island in 20-40 fms. (G. Willett); Akutan Island, Aleutian Islands, 1934, dredged, (I. Norberg) (Eyerdam); Izhut Bay, Afognak Island, Alaska, in 10 fms. mud,1922 (W.J. Eyerdam).

Dr. A. Myra Keen advises ,(Per, Comm.) " *M. gracilior* was reported at San Diego by Kelsey. I do not know its most northern occurance; as Dall says " with the type", I arbitrarily stated it to be 71 degrees in the Check List."

Massyla (Massyla) woodworthi (Dall),1905. Monterey to Santa Barbara Islands (Dall). Type locality, Monterey Bay in 10-45 fms.

" This unfigured species is said to be whitish with a yellow brown epidermis, sculptured with 8 or 9 obscure riblets on the upper whorls and rounded spiral threads with wider interspaces. On the upper whorls the spiral thread at the shoulder is the most prominent giving them a subtabulate appearance. The measurements of the type are given as, Long. 9, max. diameter 4.5 mm." (Strong).

Collecting data: Monterey Bay: 10-45 fms. (Woodworth); 50 fms. off Point Pinos, in green mud and fine sand (USFC). Apparently all known specimens of this species are in the National Museum. Mac and I have not dredged it. (A.G.Smith).

Mr. A.M. Strong comments on this as follows: " It seems strange that no other specimens of woodwardi have been collected at Monterey, the type locality. From the description of the type of the species it is very similar to gracilior but with the axial sculpture much reduced. This is not an unusual individual variant. I have an idea that this should also be considered a synonym of gracilior, but no definite statement could be made without specimens for comparison."

Subgenus Aphera H. & A. Adams,1854. Gen. Rec. Shells, vol.1,1854, p. 277. Type (by monotypy), Cancellaria tessellata Sowerby, living, west coast of America.

" The shells placed in this subgenus are like those in the typical Massyla in the absence of the siphonal fasciole and in the small, oblique plaits on the columella. They differ in the more ovate shape, short or notched canal and in having the inner lip with a heavy callus spreading over the body of the shell" (Strong).

The following list of species in the subgenus Aphera covers the entire coast and will be followed by Mr. A.M. Strong's key. We will then take up a more detailed discussion of the species reported from San Diego northward.

Massyla (Aphera) tessellata (Sowerby),1832. (Gulf of Calif. to Peru)
Massyla (Aphera) oblonga (Sowerby),1825. (Panama)
Massyla (Aphera) californica (Dall),1908. (Oregon to Gulf of Calif.)
Massyla (Aphera) corbicula (Dall),1908. (Off Santa Barbara Islands)
Massyla (Aphera) io (Dall),1896. (San Diego to Panama)
Massyla (Aphera ?) microsoma (Dall),1908. (Coronado Ids. to Acapulco)

Key to the west coast species in the subgenus Aphera

Sculpture decussated with close spaced axial ribs and spiral cords
. Whorls evenly convex, not shouldered
.. Spire blunt, shorter than the aperture
Length 20, breadth 10 mm .... tessellata
.. Spire pointed, about as long as the spire .... oblonga
. Whorls slopingly shouldered
.. Axial ribs about 20 on the body whorl
Length 16, breadth 8.3 mm .... californica
.. Axial ribs about 36 on the body whorl
Length 21.5, breadth 9.5 mm .... corbicula
Sculpture of broad axial ribs and fine spiral threads
Length 43, breadth 21 mm .... io
Sculpture of spiral cords and lines of growth
Length 3.5, breadth 1.8 mm .... microsoma

Massyla (Aphera) californica (Dall),1908. Prince William Sound, Alaska (Eyerdam) to San Diego (Kelsey). to Gulf of California (Dall) Type locality, U.S.B.E. Sta. 2980 is off San Diego, Calif.,603 fms., mud, temp. 39 degrees F.

" In the original description Dall states " It has the aspect of an Admete, in spite of the presence of an umbilicus, but is perhaps only a delicate form of Trigonostoma." Grant and Gale state, " Admete californica Dall may be another variety (of couthouyi)." However, neither recognized the true type of Admete. The deep water species, californica, corbicula, and io might well be considered to form a distinct group in Cancellariidae.

The shell is described as thin, white with a pale epidermis, the whorls slopingly shouldered, sculptured with equally spaced, low, rounded, axial ribs and spiral cords. The aperture is without canal, the umbilicus rather large, in the young relatively smaller, and the columella with three plications. The figure shows the body of the shell to be covered with a wide callus. The measurements are given as, Length of shell, 16; max. diameter 8.3 mm." (Strong).

Collecting data: Elrington Island, Prince William Sound, Alaska, dredged. Extension of range northward from Tillamook, Oregon (W.J. Eyerdam); two specimens from 80 fms. off San Diego collected by Kelsey are in the San Diego Museum.

Massyla (Aphera) corbicula (Dall),1906. " Santa Barbara Islands to Coronado Islands" (Dall). Type locality, U.S.S. Albatross Station 2936, off San Diego.

" The shell is milk white with a thin epidermis, spire short, aperture very large. The whorls are rounded with a narrow, sloping shoulder, sculptured with equally spaced, low axial ribs and spiral cords, slightly nodulous at the intersections. The umbilicus is closed, the inner lip callous, and the columella has two oblique plaits near the proximal end. The measurements are given as, Length of shell 21.5, max. diameter 9.5 mm." (Strong).

Massyla (Aphera) io (Dall), 1896. San Diego, Calif. in 650 fathoms to Gulf of Panama in 322 fatgoms (Dall). Type locality, U.S. Fish Commission Sta. 3364, in 322 fathoms, Gulf of Panama.

Dall states, " This species has much the look of a gigant Admete, but without the arched pillar. Most of the specimens were eroded, and the species has a genuine abyssal aspect." The shell is fusiform, whitish or pink, sculptured with rather stout,rounded axial ribs crossed by numerous flattened spiral threads. The columella has three plaits and the body of the shell a wide wash of callus. The measurementa of the type are given as, Height of shell 41, width of last whorl 21 mm. " (A.M. Strong).

Massyla (Aphera ?) microsoma (Dall),1908. North Coronado Island (656 fms.) to Acapulco,Mexico (660 fms.). Type locality, off Acapulco, Mexico in 660 fathoms.

" It is very difficult to place this minute, deep water species in any grouping of the family Cancellariidae and it may not belong in that family. Dall states in the original description, " This small species might be referred to Admete if it were not for the absence of concave arcuation of the pillar which is characteristic of that genus, and the presence of a small umbilical chink."

" The shell is thin with a brownish epidermis and tabulated whorls sculptured with a keel at the shoulder and spiral cords on the base, entire surface with strong lines of growth. The columella has two plaits, the anterior of which forms the edge. The measurements of the type are given as, Long. of shell 3.5. max. diameter 1.8 mm." (A.M. Strong).

Genus Admete Kroyer in Moller,1842. Index. Moll. Groen.,1842, p.15. Type (by monotypy), Admete crispa Moller, which equals Tritonium viridulum Fabricius, Fauna. Groen.,1780, p. 402. (Moller in the text ascribes the genus Admete to Kroyer).

" As explained by Pilsbry (1) Admete crispa Moller is identical with Tritonium viridulum Fabricius of the north Atlantic fauna and is closely related to Admete couthouyi (Jay) which is circumboreal. Grant and Gale (2), following Dall, give Tritonium viridulum Fabricius as the type of the genus Lora in the family Turridae in which a large group of boreal species are placed. They state (3) that Admete crispa Moller is a minor variety of Admete couthouyi (Jay). Grant and Gale (4) bring the name "Lora" viridula Fabricius into the west coast literature by making Fusus fidicula Gould a synonym. The latter is a Puget Sound species and seems to be a true Turrid, similar in shape and sculpture to viridulum but lacking the characters of the columella of the genus Admete.

The genus Admete differs from all other groups placed in the family Cancellariidae in having the columella curved instead of straight, sharply, obliquely truncated without terminal plication and with one or more feeble plication on the upper portion, frequently not visible in the aperture. The shell is more or less turrited, without umbilicus, aperture oval,without a distinct canal, and the sculpture is fine and reticulate. There may be some question in regard to placing this arctic genus in Cancellariidae as the type is said to lack an operculum and the radula to be without teeth" (A.M. Strong).

(1). Nautilus, vol.51, No.4,1938, pp. 115-118.
(2). Mem. San Diego Soc. Nat. Hist. vol.1,1931,p. 512.
(3) Loc. cit. p. 622
(4) Loc. cit., p. 514

Admete couthouyi (Jay),1839. Arctic Sea to San Diego, Calif. Circumboreal. (Dall). Johnson lists it on the Atlantic coast from Labrador to Massachusetts. Type locality, Massachusetts Bay.

" Dall in 1921 seems to have been the first to introduce the name into west coast literature. The species is not uncommon along the Alaskan coast. On the New England coast it has been taken at various depths, one record being that of Albatross Sta. 2115, in 843 fms. The San Diego record, if not a misidentification, must have been from some such depth. On both coasts the shell is quite variable in strength of sculpture, amount of tabulation to the whorls and presence or absence of plications on the columella.

It was originally described as shell,ovate, somewhat turrited, white, sculptured with distinct lines of growth, sometimes rising into folds near the sutures, and coarse spiral threads. The measurements are given as, Length 11/20, breadth 7/20 in. (approximately 12 x 9 mm)." (A.M. Strong).

Grant and Gale, 1931, p. 622 were disposed to consider this a very variable species and lump a number of species under it including middendorffiana, gracilior, etc. Obviously we are not following them in this conclusion.

Collecting data: Ketchikan, Alaska in 25 fms. (G. Willett); Izhut Bay, Afognak Island, Alaska,1922 and Drier Bay, Knight Island, Prince William Sound, Alaska 1923 (W.J. Eyerdam); Monterey Bay: 45 fathoms off Santa Cruz, and 52-59 fathoms off Point Pinos, in green mus; rare (A.G. Smith); Puget

Sound (Trevor Kincaid).

Admete couthouyi laevior Leche, 1878. Arctic Ocean to Sea Lion Rock, Wash. (Dall). and off San Juan Island, Puget Sound.

Dr. A. Myra Keen gives the following data : " Admete viridula laevior Leche, 1878. This is based on figures in Middendorff's Beitrage zu einer Malacologia Rossica, vol.2, 1848, pl. 9, figs. 13, 14 and pl. 10, figs. 1-2. The specimen in figs. 13-14 is from the Bering Sea (dimensions: height 20 mm., diam. 11 mm); the specimen in figs. 1-2 is from Lappland. Therefore the type locality is not specified."

The reference for the description is : Konlige Svenska Akademis Handlingera, vol.16, 1878, p.43. " Arctic".

" This variety seems to be unfigured. It is described as, shell larger than the typical, smoother; suture not as distinct; whorls rounded. The measurements are given as Long. 22½, lat. 11½ mm." (A.M. Strong).

The variety is also figured in Tryon, vol.7, pl.7, fig.28. However, Tryon does not list it from the west coast.

Collecting data: Forrester Island, Alaska in 50 fms. (G. Willett);

Admete couthouyi undata Leche, 1878. Arctic Ocean to Forrester Island, Alaska (Willett), Type locality, Greenland.

Dr. A. Myra Keen gives the following data: " Admete viridula undata Leche, 1878 (Kongl. Svenska Vetenskaps-Akadiemiens Handlingar, vol.16, no.2, p. 47). This is based on Middendorff's Beitrage, pl. 10, figs. 3-4, type locality Greenland. Dimensions, height 16 mm., diam. 9 mm."

This subspecies is also figured in Tryon, vol.7, pl.7, fig.27. It has not been listed from the west coast.

Collecting data: Ketchikan, Alaska in 30 fms. (G. Willett); Drier Bay, Alaska (Eyerdam) (Strong).

Admete middendorffiana Dall, 1884. Arctic Ocean to Bristol Bay, Bering Sea. (Dall). Type locality, Nunivak Island, Arctic (fide Oldroyd).

" Dall states " This form is perfectly distinct from A. viridula, and may prove to be a Cancellaria. Grant and Gale, under A. couthouyi state, " The form middendorffiana Dall, is a low spired variation." The figure shows a broadly ovate shell with a nearly straight columella and indistinct plaits, sculptured with fine spiral threads and lines of growth which form short axial ribs for a narrow space below the suture. The measurements are given on the list of plates as, Altitude 17.5 mm." (Strong).

Admete regina Dall, 1911. Arctic Sea to Pribilof Islands (Dall). Type locality, Plover Bay, Bering Sea in 25 fms.

" ... is described as having a deep, narrow umbilicus and the columella with six or more feeble plaits. It seems to be unfigured, but the characters above would bar it from the genus Admete and it probably does not belong in the family Cancellariidae" (A.M. Strong).

Family OLIVIDAE

Genus Oliva Martyn,1786. Type (by subsequent designation, Dall,1905), Oliva corticata Martyn,1786, " Coasts of Guinwa"(?), -- O, incrassata Solander (O. angulata Lamarck, fide Dillwyn..." (Grant and Gale,1931, p.623.

" Shell ovate-cylindrical, smooth, polished, spire low, suture channeled; aperture long, narrow, emarginate anteriorly, channeled posteriorly; outer lip sometimes thickened, parietal wall covered with callus, marked by fine plaits; operculum and epidermis lacking."

"Oliva is distinguished from Olivella by its larger average size, lower spire, more elongate aperture, and lack of operculum" Grant and Gale.

The genus Oliva is not represented in the California fauna, but there are a number of west coast species in the southern provinces. The following list of species will be followed by Mr. A.M. Strong's key to species.

Oliva spicata Bolten,1798/	(Lower Calif. to Panama)
variety polpasta Duclos,1840	
variety fuscata Morrat,1870	
variety oniska Duclos	
variety cumingia Reeve	
variety intertincta Carpenter	
variety pindarina Duclos	
variety hemphilli Stearns	
Oliva incrassata Solander,1786	(Magdalena Bay to Peru)
Oliva hiatula Duclos	(Gulf of California to Chile)
Oliva porphyria Lamarck	(Gulf of Calif. to Panama)
Oliva splendidula Sowerby	(Gulf of Calif. to Panama)
Oliva julieta Duclos,1835	(Gulf of Calif. to Peru)
Oliva peruviana Lamarck,1810	(Panama to Peru)

Key to species of the genus Oliva on the west coast

Shell large, operculum absent
. Columellar plaits only showing toward the base
.. Body whorl slightly contracted and angulated at shoulder
... Painted with dotted or dashed zigzag chestnut lines
50 mm. Panama to Chile .... peruviana
Tryon 5, p. 74 Reeve, pl. 9, fig. 14
. Columellar plaits numerous but short and indistinct
.. Upper part of body whorl contracted, lip waved
... Densely painted with a network of reddish lines
50 mm Scammon Lagoon to Panama .... spicata
Tryon, vol.5, pl.27, fig.62. Reeve pl.10, 8h,16b
.. Upper part of body whorl more or less swollen
... Spotted and angularly streaked with olive
80 mm Lower Calif. to Peru .... incrassata
Tryon 5, p. 82. Reeve, pl. 1 , fig. 1.
... Profusely painted with large blackish spots
Gulf of Calif. to Peru .... julieta
Reeve pl. 9, fig. 15.
.. Shell evenly, cylindrically oblong
... Mottled and lined with reddish in 2 obscure bands
100 mm. Gulf of Calif. to Panama .... porphyria
Tryon 5, p. 74. Reeve, pl.1, fig.2.
. Columellar plaits strong and distant
.. Shell fusiformly ovate
... Faintly clouded or angularly streaked with brown
60 mm. Gulf of Calif. to Chile .... hiatula
Tryon 5, p 88 Reeve, pl. 18, fig. 35

.. Shell cylindrically oblong
... Two bands of interrupted triangular brown markings
50 mm Lower Calif. to Panama .... splendidula
Tryon p 74 Reeve, pl.11, fig. 17

Genus Olivella Swainson,1831. Type (by subsequent designation,Dall, 1909), Oliva purpurata Swainson -- O. dama (Wood). Fide Grant & Gale,p. 625.

The genus Olivella has a horny operculum which distinguishes it from Oliva.

The following list of species covering the entire west coast will be followed by Mr. A.M. Strong's key to the species. We will then take up a more detailed discussion of the species reported from San Diego northward.

Olivella biplicata Sowerby,1825.	(Vancouver to Magdalena Bay)
Olivella baetica Carpenter,1864.	(Aleutians to Cape San Lucas)
Olivella porteri Dall,1910.	(Redondo to Magdalena Bay)
Olivella pedroana Conrad,1855 - pycna Berry,1935.	(Puget Snd. to Cape San Lucas).
Olivella petiolita Duclos.	(Newport to Gulf of California)
Olivella dama Mawe in Wood,1828.	(Gulf of Calif.)
Olivella tergina Duclos,	(Magdalena Bay to Peru)
Olivella myriadina Duclos,1835.	(Gulf of Calif. to Panama)
Olivella undatella Lamarck,1810.	(Gulf of Calif. to Panama)
Olivella zonalis Lamarck,1810	(Gulf of Calif. to Peru)
Olivella gracilis (Sowerby),1829	(Gulf of Calif. to Panama)
Olivella semistriata Gray,1839.	(Gulf of Calif. to Peru)
Olivella kaleontina Duclos,1835.	(Gulf of Calif. to Peru)
Olivella anazora Duclos	(Gulf of Calif.)
Olivella volutella Lamarck,1810.	(Gulf of Calif. to Peru)
Olivella zonoeta Duclos	(Gulf of Calif.)
Olivella tehuelcha Duclos	(Tres Marias Islands to Panama)
Olivella versicolor Mawe.	(Central America)
Olivella salinasensis Bartsch,1928.	(Ecuador)
Olivella quayaquilensis Bartsch,1928.	(Ecuador)
Olivella columellaris Sowerby,1825.	(Central America to Peru)

Key to species of west coast Olivella

Columella smooth except for a terminal spiral plication
. Plication cut by one or two incised spiral lines .... biplicata
. Plication smooth, rounded
.. Surface of body whorl smooth
... Body whorl broad, with a short spire .... pycna Berry
... Body whorl slender, spire elevated
.... Shell very small, pure white .... myriadina Duclos
.... Shell not pure white
..... Columella white, colors variable .... baetica Carp.
..... Columella chestnut on upper part, colors banded ....zonalis Lamarck
.. Surface of body whorl finely sculptured
... Fine spiral striations on lower part of body whorl...... semistriata
... Fine axial ribs on upper part of body whorl .... columellaris
Columella with numerous plications
. Plications in a graded series,stronger toward the base
.. Shell slender, fusiform, columella white .... gracilis B. & S.
.. Shell oblong, body whorl broad
... Spire elevated, columella purplish .... dama Mawe

... Spire blunt, columella bluish white .... tergina Duclos
. Plications not in a graded series
.. Plications divided into two groups
... Basal group of plications 4, upper numerous ..... undatella Lamarck
... Both basal and upper groups of plications numerous. anazora Duclos
.. Plications all basal, strong .... volutella Lamarck

Several species listed are not included in the key. Some are of very doubtful standing. In others the columella plications are not described. If the characters of the plications are constant for the species and they seem to be, it makes an easy way to divide the species into several main groups.

Another key to west coast species of Olivella

Shell smaller, operculum present .... Genus Olivella
. Columella smooth, ending in a single plication
.. Shell elliptical, basal plication strong
Puget Sound to Cape San Lucas .... pycna
.. Shell oblong, basal plication obscure
... Ivory white, semi-pellucid
4 mm Gulf of Calif. to Panama .... myriadina
Tryon 5, p. 68
.. Shell ovate, rather swollen above the middle
... White, with 3 spiral chestnut bands
6 mm Tryon 5,p.67. Reeve pl.29,fig.91. Gulf of Calif. to Peru .... zonalis
.. Shell ovate, base broad and truncated
... Posterior half of last whorl spirally striated
.... Grayish, with a yellowish spiral band
Gulf of California to Peru .... semistriata
Tryon 5, p. 67. Reeve pl. 20, fig. 61.
... Anterior half of last whorl axially striated
.... Bluish, with 2 narrow yellowish spiral bands
15 mm Panama to Peru .... columellaris
Tryon 5, p. 67. Reeve, pl.23, fig.22
. Columella ending in a double plication
.. Shell short ovate, stout
... Bluish or grayish, usually unicolor
25 mm. British Columbia to San Diego .... biplicata
.. Shell oblong, spire sharp pointed
...Grayish or drab, unicolor or with darker maculations
20 mm. Alaska to Cape San Lucas .... baetica
... Yellowish, blotched or lined in tent-like patterns
15 mm Redondo to Magdalena Bay .... porteri
. Plications numerous, increasing in size toward the base
.. Shell slender, fusiform
... Whitish, with irregular darker reticulations
20 mm Gulf of Calif. to Panama .... gracilis
Tryon 5, p. 78. Reeve pl.20, fig.46
.. Shell oblong-cylindrical
... Purplish, variegated and spotted with reddish
33 mm Gulf of Calif. to Peru .... kaleontina
Tryon 5, p.86. Reeve, pl.20, fig.49.
.. Shell oblong
... Spire long and tapering
.... Whitish, sutural band of brown lines, then reticulated
25 mm Tryon 5,p.71, Reeve pl 23,f.63. Gulf of Calif. dama

... Spire moderate, sharp pointed
.... Purplish, subsutural bandand reticulations chestnut
18 mm Tryon 5 p. 66 Gulf of California .... petiolita
... Spire blunt and swollen
.... Yellowish, reticulated with brown
15 mm. Gulf of Calif. to Peru .... tergina
Tryon 5, p.66 Reeve pl.26, fig.80
.. Plications divided into two groups
.. Shell cylindrically ovate, spire rather short
... Whitish, zigzag brown lines in two bands
20 mm Gulf of Calif. to Panama .... undatella
Reeve pl. 25, fig. 73 Tryon 5, p. 70
.. Shell oblong, spire moderate
... Whitish, with waved brown axial lines
18 mm Gulf of California .... anazora
Reeve pl.25, fig.74
. Columella ending in a group of strong plications
.. Colors variable, unicolor or faintly axially lined
30 mm Gulf of Calif. to Peru .... volutella
Tryon 5, p. 73. Reeve, pl.21, fig.54.

Olivella biplicata(Sowerby)1825 Vancouver Island, B.C. to Magdalena Bay, L.C. (Dall). Type locality " West coast of North America".

This is our common stout heavy shell species. Among the many color varieties described are the following: angelina T.S. Oldroyd,1921; fucana T.S. Oldroyd,1921; lapillus Vanatta,1915; parva T.S. Oldroyd,1920. These subspecies have been generally placed in the synonymy of the typical. If any of these are valid the range extensions would cover the range of the typical. Dr. D.S. and E.W. Gifford have contributed several very fine papers that should be consulted by those interested in the color forms of this species- " Color variation in Olivella biplicata", Nautilus, vol.55, no.1, p. 10- " Color variation in Olivella biplicata in various localities" Nautilus vol. 56, p. 43- " Californian Olivellas" Nautilus vol.57, p. 73.

The consensus of opinion is that while there may be local races of this species that retain rather consistently their minor variations in their particular locality, they are, nevertheless of no real importance. However, there are opinions on the other side from many careful students. Dr. Joshua L. Baily Jr. states (Per. Comm. April,1945) " The varieties angelina and lapillus I believe to be legitimate. Angelina I take to be an obvious typographical error for angelena. The other two varieties I am not familiar with. Lapillus is the white color variety which had already been given another name which has no standing because it was published without a description. I believe Mrs. Williamson called it alba . .. Angelena is the common form. The typical form is the heavy coarse looking form from the north, and is quite distinct... I believe that Mrs. Williamson also used the varietal name brunnea, also without description. It is a name of no value, but for the sake of completeness it might as well be mentioned in your notes. Mr. Vanatta was of course familiar with it, and the fact that he published a name for alba but not for brunnea shows that he considered the latter name of no importance. The only really brown olives I have ever seen have been dead specimens. Some day I would like to make a biometrical study of all the olives on this coast.." Walter J. Eyerdam reports O. b. fucana T.S. Oldroyd,1921 from Straitm of Fuca, Wash. Dr. D.S. and E.W. Gifford state (Per. Comm. April,1945) " We really have little to add to the opinions expressed in our articles in " The Nautilus". As you may judge by these, we regard certain forms of biplicata described under separate names as probably falling within the range of individual variation rather than being true subspecies. "

Collecting data: The species seems to be seasonably abundant in certain places. For example it is possible to collect them by the bushel if desired in Morro Bay and other lagoons during the months of June, July, and August. They are almost always present but apparently not in such large numbers. The habitat is just beneath the surface of the sand. They may be easily detected by the trail they leave. With a large screenand spade it is possible to collect great numbers in a very short time. Our experience has been to find them a common species from Monterey to Todos Santos Bay and in almost all possible habitats. We have takenthem on sandy beaches along the open sea, in rocky rubble and in algae, in muddy lagoons, and the bathymetric range is of some interest. We picked this species up in our dredged in at least 20 fathoms off Monterey, in 25 fathoms off Redondo Beach, and from shale, sand and gravel bottoms. (Burch); Monterey Bay (Hemphill); Avila, Calif. (Wilcox); Bolinas, Calif. (Gifford); Morro Bay and San Pedro (Lowe); San Diego and Point Loma (Bristol); La Jolla (Bristol); San Diego Bay (Hemphill); " I have taken fine specimens at Duxbury Reef, near Bolinas" (A.G. Smith).

Olivella baetica Carpenter,1864. Kodiak Island, Alaska to Cape San Lucas (Dall). Type locality not specified according to Dr. A. Myra Keen. Mrs . Oldroyd stated that it was San Diego.

There has been some confusion about this species. A number of subspecies have been described and other species placed in the synonymy. O. b. diegensis T.S. Oldroyd ,1921 and O. b. mexicana T.S. Oldroyd,1921, have been very generally placed in the synonymy of the typical. The consensus of opinion is to place Olivella porteri Dall,1910 in the synonymy of this species. We have topotypes from San Diego, the type locality of porteri and other sets so labelled. The late Dr. Fred Baker considered it a good species. Grantand Gale consider it a valid subspecies of baetica. However, the opinions of the majority is well stated by the terse note of Mr. George Willett " I think porteri is a variant of baetica of no taxonomic importance." Mr. A.G. Smith comments " My recommendation would be to drop porteri into the synonymy of baetica. Packard's report of porteri from San Francisco Bay undoubtedly refers to O. pycna Berry."

Dr. Joshua L. Baily Jr. makes some interesting comments (Per. Comm . April,1945) " Olivella baetica. Frequently misspelled boetica, because the edition of Carpenter's work in which the name was first proposed used a type in which the combination of letters that were united in a single character made the a look more like an o. If this be compared with the termination -idae in the same work it will readily be seen that Carpenter spelled the name baetica. When Keep brought out the first edition of West Coast Shells he believed that all forms of Olivella s.s. from our coast could be retained in a single species and so it wasnt a matter of great importance which form he figured. I believe now that what he figured as baetica is really porteri but I did not think so when I prepared the revised text. The typical baetica I believe is the one figured by Mrs. Williamson in Proc. U.S.N.M. v. 15 in 1892. If all specimens were as distinct as these two cuts there would be no doubt that they are good species. In my collection theyare pretty distinct but I cannot separate them in Dr. Berry's collection and I doubt if porteri is anything more than a place-mode of baetica. The name is in the literature and perhaps we will find it necessary to keep it but I doubt if it is even a good subspecies."

Olivella pedroana (Conrad),1855 is another specific name confused with this species, and with the following species pycna Berry. D.S. and

E.W. Gifford comment on these as follows (Per. Comm. April,1945) " As to the smaller species, pycna and pedroana seem distinct. We regard pedroana and baetica as merely two names for one species, and of course, pedroana has priority. We have not seen intorta and porteri , but would not be surprised if they fell within the limits of variation of pycna and (or) pedroana. "

Collecting data: The habitat of this species is very general. We have taken it in great numbers at certain seasons in the lagoons. In June and also in October we recorded it as being very abundant inside the Estero below Ensenada,Mexico, but it seems difficult to state a season of the year for it because we have found it in vast numbers for example at San Onofre, Calif. in the rubble reef and sand in November, and in almost unlimited numbers on the sandy beaches between Long Beachand Seal Beach in Jan. and Feb. It is a common dredged shell. Our experience being being to bring it up from as deep as 40 fms. off Monterey (but more abundant around 20 fms.), Redondo Beach and also off Avalon, Catalina Island in 25 fms. and less, San Pedro, Calif. in 20 fms., Ensenada,Mexico in 15 fms. (Burch); Southeastern Alaska, north to Sitka, 15-20 fms. (G. Willett);"Also we collected in November a large series of pedroana (or, as you call it,baetica) in the Estero below Ensenada, to which place you kindly directed us." (Gifford); Izhut Bay, Afognak Id., 1922 in 10 fms. sandy mud and also Drier Bay,Knight Island,1923 in 15 fms. sandy mud (W.J. Eyerdam); Hinchinbrook Island,Alaska (Norberg) (Eyerdam); " As you go north this species gets bigger, apparently reaching the maximum size in Alaska. The Monterey form, as you know, is a relatively small one. The most southern record for a large specimen is a single one dredged in 50 fathoms on Cordell Bank, 18 .4 mm. in length. The lengths of a lot from Alaska range from 15.4 to 21.6 mm. (A.G. Smith); San Diego (Fred Baker); San Diego Bay (Hemphill); La Jolla (Bristol); Jefferson Point, Puget Sound (H.N. Lowe). As O. porteri- San Diego Bay (Lowe); San Diego (Dr. Fred Baker); So. Coronado Island, 6-15 fms. (Dr. Fred Baker); San Benito Island, Lower Calif. in 10 fms. (Lowe).

Olivella pycna Berry,1935. Proc. Malac. Soc. London, vol.21, no.4 (1935), pp 262-65, 1 fig. in text. Port Orford, Oregon south to Morro Rock, San Luis Obispo Co. (Burch). Type locality: Bolinas Bay, Calif. in 3-4 fms.

" Shell small,heavy,elongate-nuciform, widest near the middle, the spire tapering almost straightly to an acute point; anterior extremity truncate. Whorls seven, their slopes nearly straight on the spire, the body whorl large and strongly convex. Suture sharply, narrowly, and deeply channelled. Aperture about three-fifths the length of the shell, the outer lip sharp and distinctly arcuate, its obtuse anterior lobe slightly exceeding the columella anteriorly past the short notch like canal. Parietal wall covered by a strong white callus, heaviest and of greatest extent posteriorly where it rounds rather abruptly to pass under the free and overhanging outer lip just in front of the sutural channel, the parietal callus not passing the suture but confluent in the channel with a second low callus just posterior, developed as the termination of a low calloused band which bounds the channel posteriorly and covers about a third of the adjoining whorl before its gradual and final dissapearance. Columellar fold moderately heavy, usually distinctly duplex but sometimes single, the columellar and extreme anterior region covered by a third white callus which is overlain near the aperture of the parietal callus. Surface smooth, lustrous under magnification seen to be very finely and closely covered with minute wavy spirals on the uncalloused portions which are again minutely decussated by the numerous fine lines of growth. Parietal callus minutely punctate.

Colour light brownish buff (usually quite near Tilleul Buff), clouded brownish, though usually with a rather wide buff spiral band persisting below the suture , the whole conspicuously ornamented by numerous highly irregular wavy stripes of Fawn Colour or Army Brown, with occasional suffusion of Light Vinaceous Drab; interior, except the buff lip-margin, Walnut Brown to Cameo Brown; callous portions white as noted" Measurements of the holotype are given, Long. 13.6 mm; max. diam. 7.5; outer lip, 8.4; whorls 7.

Dr. Berry discusses the problems connected with pedroana dnd intorta at length. Dr. Joshua L. Baily Jr. states our problems very clearly as follows (Per. Comm. April,1945) " Olivella pycna. When Dr. Berry described this species he made it clear that he was not describing a new species but only giving a new name to an old species because he was doubtful as to the validity of the two names by which it was already known. I have never seen the type of pedroana Conrad but I understand that it is a fossil and that it is broken, which is probably why Dall thought it was identical with baetica at one time and with intorta at another. Unfortunately the name pedroana is the oldest name applied to either of our two species of Olivella s.s. and it must be used for one of them. My personal feeling is that since so many people have held opinions at one time which conflict with the opinions held by the same people at othertimes it is clear that the type is too badly damaged for identification and that the species should be omitted altogether on the ground that the name is a nomen nudum. Dr. Bartsch would not commit himself as to what it might be, but would only say that he thought it was the sameas intorta. This was before Berry had published pycna. As for the name intorta, this was originally given to a Gulf of California species. Whether it was the same as our California species I do not know. It is not impossible that intorta was at one time a widely distributed species that has since become extinct in the middle of the range leaving two geographically distinct habitats. This is the case with Trivia solandri which is found in the northern part of the Gulf but not in the southern part, and also on the coast of the ocean. But it is not likely that this is the case, and therefore it is somewhat doubtful if the name belongs to our Olivella. Therefore I think Berry did quite right in renaming it, and I prefer to use his name because it is the first name to be applied to it which is beyond all possibility of doubt. All shells from our coast which have been labelled intorta are almost certainly pycna. But pedroana is something os a mystery. Dr. Bartsch suggested that it might be a place-mode of intorta. Probably he is right ."

Mr. A.G. Smith states his opinions on this problem as follows (Per. Comm. April,1945) " O. pedroana. I agree with Berry that this is unidentifiable without access to the type, which is lost. For a long time I have had the feeling that O. pycna may be the same as pedroana. This point might be settled if some of you southern California fossil collectors discover specimens with enough color left on them to show whether they have the peculiar zig-zag markings of pycha. I have seen plenty of fossil specimens that agree with pycna in shape. With respect to the small Olivellas I agree that Berry is the one to follow, although the last word may not have been said on the problem. It is quite possible that a good case may be made out for calling the large northern form of O. baetica at least a new subspecies on the basis of size and color markings, especially on the upper portion of the body whorl. My experience with baetica from southern California bays, such as Newport and Mission, is that the colors generally tend to be darker on shells freshly collected. The colors tend to fade after having been in the cabinet for awhile."

Mr. George Willett states " This is probably Conrad's pedroana , but he gave no description and I agree with Berry that his figure is not identifiable."

Mr. A.M. Strong stated an opinion on the Olivella pedroana (Conrad) matters as follows: " Dall changed his mind several times in regard to the use of this name but never gave his reasons so we do not know what he considered to be the true characters..Berry in the Nautilus listed a shell from Bolinas Bay as the true O. pedroana. I have specimens from this lot that he gave me. Later, Proc. Mal. Soc. vol. 21, pt.4, p.262, he described a new species. Olivella pycna, using as a type a specimen from this lot. This is a rather short, stumpy shell with but a single fold on the columella. This shell has been taken at Monterey and lately at Morro Bay, and seems to be quite rare. I would be inclined to take Berry's first opinion."

Collecting data: Collected several hundred specimens off Morro Rock at the entrance to Morro Bay, San Luis Obispo Co. in January,1937, and dredged a number of specimens off Pacific Grove, Calif. in 15 fms. (Burch); Princeton, San Mateo County, and at Stinson Beach, Marin Co. (Gifford); Bolinas Bay 3-4 fms. (Weymouth); S. side Tamales Bay, Hog Is. (Williams)

Olivella intorta Carpenter,1856. Proc. Zool. Soc. London for 1856,p.207.

" O.t. parva,ovoidea, subtumente; sutura vix sulcate; albido-grisea, fascia indistincta subsuturali olivacea,flammulis et maculis purpureo-fuscis plus minusve ornata; apertura antice aperta, postice angusta; callositate parietali ad suturam penultimam producta; columella maxime intorta, plica ad basin acuta, in pariete duabus saepe indistinctis; extus, linea spirali antica unica."

Long. .52. long. spir. .17, lat. .26, div. 60 deg.

Hab. San Juan; legit Dr. Green. Mus. Gould. Item, loc. incert. Mus Cuming.

A well marked species, resembling the West Indian O. bullata , on a much larger scale. The specimens vary in tumidity and height of spire. The parietal callosity extending over the penultimate whirl hides the colour of the spire."

Thanks to Dr. Leo Hertlein for sending us the above copy of the original description of intorta. This specific name is of particular interest because of the very common belief that this species, pedroana and pycna are perhaps identical. And there are countless sets of shells around with the label intorta and no one quite certain what it is.

Mr. A.M. Strong makes an interesting suggestion " I would rather expect it might be O. baetica mexicana Oldroyd. We should have almost everything in the shape of Olivellas from that territory."

Olivella petiolita Duclos. ? Newport, Calif. to Gulf of Calif. ?

It is not our intention to propose adding this species to the California fauna until we have had more information. Mr. George Willett has a set of shells from off Newport that may prove to be this species or perhaps a new species.

Genus Agaronia

Agaronia testacea Lamarck Gulf of California to Panama.

Genus Harpa

Harpa crenata Swainson,1822. Gulf of Calif. to Panama

Family MARGINELLIDAE

The following key is taken from Mr. A.M. Strong's notebook.

Shell with a visible spire
. Shell large, 3/4 inch or more in length .... Marginella
.. Spire low, indistinct................................ (Prunum)
... Interior brownish, outer lip white .... sapotilla Hinds
... Interior orange tinted, outer lip edged with violet.. curta Sowerby
... Interior white, outer lip tinted with yellow ... albuminosa Dall
. Shell small, less than ½ inch in length
.. Outer surface with color markings
... Shell ovate or oblong............................. Persicula
.... Surface with half moon shaped spots in spiral rows
..... Spots concave to the right .... frumenta Sowerby
..... Spots concave to the left .... phrygia Sowerby
.... Surface with spiral series of interrupted, dark lines
..... Spiral lines tending to form a darker
peripheral band .... imbricata Hinds
..... Spiral lines tending to form two darker bands .. adamsiana P. & L.
.... Surface with spots and streaks elongated axially.. dubiosa Dall
.... Surface with square brown dots .... ? tessellata Lamarck
... Shell elongated, sides almost parallel .... Hyalina
.... Shell rather stout, colors distinct, banded ..... californica Tomlin
.... Shell more slender, color bands fainter .... parallela Dall
.. Shell pure white .... Cystiscus
... Length 4.5 mm. Ratio diam. to length 1 to 1.5....... jewettii Carp.
... Length 3.5 mm. Ratio diam. to length 1 to 1.27 ... subtrigona Carp.
... Length 3.25 mm.Ratio diam. to length 1 to 1.44 .. regularis Carp.
... Length 3.0 mm. Ratio diam. to length 1 to 2 ...... politulus Dall
... Length 3.3 mm. Ratio diam. to length 1 to 2.1 ... myrmecoon Dall
... Length 2.25 mm.Ratio diam. to length 1 to 1.6 .... minor C.B. Adams
... Length o.85 mm.Ratio diam. to length 1 to 1.55 .. polita Carpenter
Spire covered by an extension of the outer lip ..... Cypraeolina
. Shell very small, white, sometimes tinged with orange- pyriformis Carp .
. Shell smaller, lower end of aperture narrower .... margaritula Carp.

Marginella eremus Dall and M. anticlea Dall not included. I can find no genus in which to place them.

The following list of species covers the entire coast. We will then take up a more detailed discussion of the species ranging north of San Diego, Calif.

Genus MARGINELLA Lamarck,1799 Type, Voluta glabella Linnaeus.
Subgenus Prunum Herrmannsen,1852. Type M. prunum Gmelin.
Marginella (Prunum) curta Sowerby,1832. (Gulf of Calif. to Peru)
Marginella (Prunum) albuminosa Dall,1919. (West Mexico)
Marginella (Prunum) sapotilla Hinds,1844. (Panama to Peru)
Marginella (Prunum) marginata Born. (Panama, also Atlantic).
Genus Cystiscus Stimpson,1865. Type, C. capensis Stimpson.
Cystiscus jewettii (Carpenter),1865. (Monterey to Lower Calif.)
Cystiscus regularis (Carpenter),1865. (Monterey to Gulf of Calif.)
Cystiscus subtrigona (Carpenter),1865. (Monterey to San Diego)
Cystiscus politulus(Dall),1919. (Santa Barbara to Cape San Lucas)
Cystiscus minor (C.B. Adams),1852. (San Pedro to Panama)

Cystiscus politus (Carpenter),1857. (Gulf of Calif.)
Cystiscus anticlea(Dall),1919. (Galapagos)
Genus Persicula Schumacher,1817. Type, P. variabilis Schumacher
Persicula phrygia (Sowerby),1846. (Gulf of Calif. to Galapagos)
Persicula frumenta(Sowerby),1832. (Gulf of Calif. to Chile)
Persicula dubiosa (Dall),1871. (Gulf of Calif. to Acapulco)
Persicula imbricata (Hinds),1844. (Acapulco to Galapagos)
Persicula tessellata Lamarck (Central America to Panama)
Persicula rubella (C.B. Adams),1845. (Galapagos West Indies)
Persicula adamsiana (Pilsbry & Lowe),1932. (Panama Bay)
Marginella (Serrata) eremus Dall,1919. (Galapagos)
Genus Hyalina Schumacher,1817. Type, H. pellucida Schumacher.
Hyalina californica (Tomlin),1916. (San Pedro to Puerto Libertad)
Hyalina myrmecoon (Dall), 1919. (San Diego).
Genus Cypraeolina Cerulli-Irelli,1911. Type, Cryptospira clandestina Br.
Cypraeolina pyriformis (Carpenter),1865. (Alaska to Cape San Lucas)
Cypraeolina margaritula (Carpenter),1857. (Gulf of Calif. to Panama).

Genus Hyalina Schumacher,1817. Type (by monotypy), H. pellucida Schumacher.

" Shell small; spire low or concealed by a callus wash or by the posterior margin of the aperture; outer lip simple or slightly thickened, without strong denticulations."

Hyalina californica (Tomlin),1916. Santa Monica Bay, Calif. (Burch) to Puerto Libertad, Mexico. Dr. A.M. Keen calls attention to the fact that the species was reported from the Galapagos by Stearns; Type locality, San Pedro, Calif.

This species is reported by earlier authors as M. varia Sowerby.

Dr. Joshua L. Baily Jr. comments on our changes in nomenclature as follows (Per. Comm. April,1945), " Hyalina californica. This name is something of a mystery to me. I believe the true varia is something different, or that Dr. Tomlin considered it so. I do not know what the true varia is. The name Hyalina is used for what formerly was called Volvarina Hinds. This may or may not have been the same as Volvaria Lamarck which is now placed in the Acteonidae. No one has ever published a synonymy of this complex of names to indicate why Hyalina should be used. We must take it on authoritarian grounds. And I do not know why Cystiscus and Cypraeolina should be made subgenera of Hyalina. To my mind they don't look enough alike. I should consider calling them all subgenera of Marginella ."

Collecting datal Habitat in rocky rubble under stones at low tide line. It is not an uncommon little shell but it takes rather a low tide to collect them. We have taken them in numbers from Santa Monica Bay at Malaga Cove, Pt. Firmin,San Onofre, to Punta Banda, Mexico. The bathymetric range is not deep but we have brought them up in gravel as deep as 25 fms. off Catalina Island (Burch); Guaymas, Sonora,Mex.; Pta. Penasco,Mex.; Pta. Libertad, Sonora; La Paz; Angeles Bay; San Felipe,Mex.; Topolobampo; San Nicholas Island; San Pedro, Calif. (H.N. Lowe); La Jolla, Calif. (Bristol); San Diego (Kelsey)

The southern species or subspecies perhaps as it was described as Marginella californica parallela Dall may have some bearing on the range. Mr. A.M. Strong comments on it as follows: " The variety is smaller, even more slender, and much paler in color. There is a reference to M. varia Sby. in Proc. Wash. Ac. Sci. vol.4, p.555, which probably belongs here and the variety seems to be the southern form of the California species. It is also probable that some of the southern records listed should really be referred to the variety and it might be well to consider it a good species."

Genus Cystiscus Stimpson,1865. Type (by monotypy), Cystiscus capensis Stimpson -- (Marginella cystiscus Redfield). fide Grant & Gale

" Shell small, ovate, aperture hardly reaching spire, which is very low and inconspicuous."

" This . is a group intermediate between Hyalina with a definite spire and Cypraeolina with the spire concealed by the posterior margin of the elongated aperture" (Grant and Gale).

Mr. A.M. Strong states " These form a very distinct, closely related group on the west coast. They are very small with a low spire covered with a transparent callus. The color is pure white and they are highly polished. Dall says of them (Proc. U.S.N.M. vol.56, p.307) " The differences between these small Marginellas are not great but appear to be constant enough to take specific rank". The best way to distinguish them is by the size and the relative length and diameter."

Cystiscus jewettii (Carpenter),1857. Monterey, Calif. to San Martin Island, Lower Calif. (Baker). Type locality, Santa Barbara, Calif.

Collecting data: Rather common in dredgings off Monterey, Calif. in 20 fms. on shale bottom (Burch); San Pedro, washed in on shore (G. Willett from Tremper); St. Vincent, Calif. (Lowe).

Cystiscus subtrigona (Carpenter),1864. Monterey, Calif. to (Lat.27,Mex.) (Keen Check List). Type locality, Santa Barbara, Calif.

Collecting data: Dredged in 25 fms. off Redondo Beach, Calif. gravel bottom, taken littoral under the rocks at Bird Rock, San Diego Co. at low tide. Have sets from Dr. Fred Baker dredged off S. Coronado Island (Burch); beach drift at Pacific Grove, rare (A.G. Smith); San Pedro in 15 fms. (G. Willett); San Pedro, Calif.; Catalina Island, Calif. in 50 fms. (Lowe); La Jolla, Calif. (Bristol); San Diego Bay (Dr. Fred Baker and Hemphill); S. Coronado Island in 7-14 fms. and San Martin Island, L.C. (Dr. F. Baker).

Cystiscus regularis (Carpenter),1864. Monterey, Calif. to Gulf of Calif . Type locality, Santa Barbara, Calif.

Collecting data: From algae at Monterey, Calif. low tide on rocks, dredged off Avalon, Catalina Island, Calif. in 25 fms. , littoral on Bird Rock, San Diego Co. (Burch); Cayucos, Calif. in 10 fms. and Catalina Island in 30 fathoms (G. Willett); San Pedro, Calif. (Lowe); Monterey (Button); fairly common in Monterey Bay (A.G. Smith).

Cystiscus myrmecoon (Dall),1919. San Diego, Calif.

Mr. A.M. Strong thinks this is very close to politulus and may be identical.

Cystiscus politulus (Cooper MS) Dall, 1919. Santa Barbara, Calif. to Tres Marias Islands (Strong and Hertlein). Type locality, Catalina Island Calif.

Collecting data: Espiritu Santo Is., Gulf of Calif.; San Geronimo Is., L. Calif.; La Paz (H.N. Lowe).

Cystiscus minor (C.B. Adams),1852. San Pedro, Calif. to Panama. Type locality, Panama.

Collecting data: Bay of Panama (H.N. Lowe); San Diego Bay in 2 fms ., San Martin Island, L.C.; Scammons Lagoon, L.C.; S. Coronado Island in 7-14 fathoms (Dr. Fred Baker).

Genus Cypraeolina Cerulli-Irelli,1911. Type (by monotypy), Cryptospira clandestina Brocchi. Merovia Dall,1920 is in the synonymy.

" Shell small, aperture lengthened posteriorly, margin covering the apex of the shell".

Cypraeolina pyriformis (Carpenter),1865. Izhut Bay, Alaska (Eyerdam) to Mazatlan, Mexico. Type locality, San Diego, Calif.

Collecting data: A very common shell the length of the coast in our collecting experience. Habitat connected with rocks or gravel probably i n the algae. Very abundant in algae around Monterey littoral although we brought it up in the dredgings in great numbers down as deep as 40 fms. although it was more abundant around 20 fms. Common in the gravel off Redondo Beach, Calif. in 25 fms. An odd little thing is that it is rather common on the backs of the large Haliotis rufescens brought into the markets at Monterey and Morro Bay. We have it from Puget Sound to Todos Santos Bay, Lower Calif. (Burch);

Izhut Bay, Afognak Island,1922, Elrington Id. and Drier Bay, Knight Id., Alaska,1923 and 1924, collected by W.J. Eyerdam. Mostly on nullipores at low tide. About one out of ten specimens are white instead of pink. Extended range northward 400 miles and westward 700; Ketchikan, Craig, Forrester Island, Alaska, littoral (G. Willett); Palos Verdes, Calif. (Lowe); Monterey (Lowe); N. Coronado Island (Frank Stephens); Ballast Point, San Diego (Kate Stephens); Bear Bay, Peril Strait, Alaska (Kate Stephens); Magdalena Bay (Orcutt)

Mr. A.M. Strong comments on Cypraeolina margaritula (Carpenter) " About the only way that this can be separated from C. pyriformis is by the smaller size and very slightly different shape. One is the northern and the southern form begins to appear somewhere around Cape San Lucas a and ranges to the Galapagos."

Family VOLUTIDAE

Genus Boroomelon Dall,1918. Proc. Biol. Soc. Wash. vol.31, p.137, 1918. Type, Scaphella stearnsii Dall,1872.

Dall described Boreomelon as a subgenus of Fulgoraria Schumacher, 1817. Maxwell Smith in " A Review of the Volutidae",1942 raised Boreomelon to generic standing. This sounds logical judging from the figures. I have not seen the species.

Boreomelon stearnsii (Dall),1872. " Shumagin Islands, Alaska and westward to Captain's Bay, Unalaska, in 40 to 100 fathoms, rocky and muddy bottom; also in Bering Sea northward to the line of floating ice in winter" (M. Smith). Type locality, Pribilof Islands, Alaska.

Boreomelon benthalis (Dall),1895. Gulf of Panama in 1672 fatgoms. This species was described as Scaphella by Dall and later in his " A Rev. of American Volutidae",1907 placed it in Adelomelon.

Genus Phenacoptygma Dall,1918. Type (by orig. desig.), Daphnella corteza Dall,1908.

Phenacoptygma cortezi (Dall),1908. Off Cortez Bank in 984 fms. and off San Diego, Calif. in 639 fms. Type locality, off Cortez Bank.

Genus Adelomelon Dall,1906. Nautilus, vol.19, no.12, p.143. Type " Voluta" ancilla Solander.

Adelomelon magellanica (Lamarck),1811. This species is generally listed with a range of from Chile to Magellan Straits on this coast and from

Uruguay south on the other coast. Our interest in this species is that Scaphella arnheimi J.J. Rivers,1891; Proc. Calif. Acad. of Sci., 2nd Ser. 3, July 14,1891, is generally placed in the synonymy of magellanica and was described by Rivers as having been dredged in Monterey Bay. Dr. A.M. Keen advises " Dall in 1909, USGS Prof. Paper 59, bibliography, says, concerning Scaphella arnheimi; " The shell is really from Magellan Strait." Somewhere else I remember reading a note to the effect that Rivers had mixed locality labels. The species should be deleted from our fauna.

Other species of the family Volutidae reported from the west coast south of San Diego follow:

Adelomelon ancilla (Solander),1786. (Chile to Magellan Straits)
Genus Miomelon Dall,1907.
Miomelon philippiana (Dall),1889. (Chile)
Genus Enaeta H. & A. Adams,1853.
Enaeta cumingii (Broderip),1832. (Peru to Magdalena Bay)
Enaeta barnesii (Gray),1825. (Cape San Lucas to Peru).
Enaeta pedersenii Verrill,1870. (La Paz, Mexico).
Genus Tractolira Dall,1895.
Tractolira sparta Dall,1895. (Gulf of Panama)
Genus Calliotectum Dall,1889.
Calliotectum vernicosum Dall,1889. (Off Ecuador and the Galapagos)

Family MITRIDAE

Genus Mitra Martyn,1784. Type (by subsequent designation, Dall, 1905), Mitra tessellata Martyn.

The question of the use of Martyn or of Lamarck,1799 is again presented. Dr. A. Myra Keen advises (Per. Comm.) " Until the International Zoological Commission rejects Martyn's names in their entirety, I believe we must adopt his generic names. It is to be hoped a decision will be forthcoming some time on both Martyn and Chemnitz."

Dr. Dall placed most of our species under the genus Strigatella Swainson,1840 and subgenus Atrimitra Dall,1918. The type of Strigatella is Mitra zebra Lamarck, a smooth, rather short species much like a Pyrene" fide Grant and Gale.

The following list of species covering the entire coast will be followed by Mr. A.M. Strong's key to species. We will then take up a detailed discussion of the species ranging from San Diego northward.

Mitra fultoni E.A. Smith,1802.	(San Diego to Ballenas Lagoon)
Mitra idae Melville,1893.	(Farallones to Cortez Bank)
Mitra mexicana Dall,1919.	(Guaymas)
Mitra orientalis Martens,1897.	(Ecuador to Chile)
Mitra swainsonii Broderip	(Central America)
Mitra zaca Strong and Hertlein	(Santa Maria Bay, L. Calif.)
Mitra catalinae Dall,1919	(Crescent City to Todos Santos Bay)
Mitra coronadoensis Baker & Spicer,1932.	(Coronado Island)
Mitra diegensis Dall,1919.	(Catalina to San Diego)
Mitra delorosa Dall,1903.	(Gulf of California)
Mitra loweana Pilsbry,1931.	(San Pedro to San Geronimo Id., L.C.)
Mitra salinasensis Bartsch,1928.	(Ecuador)
Mitra attenuata Reeve,1844.	(Acapulco to Panama)
Mitra crenata Swainson,1835.	(Cape San Lucas to West Colombia)
Mitra effusa Swainson,1835.	(Gulf of Calif. to Panama)
Mitra erythrogramma Tomlin,1931.	(Corinto to Panama)
Mitra funiculata Reeve,1844.	(Gulf of Calif. to Central America)

Mitra belcheri Hinds,1843. (Magdalena Bay to Central America)
Mitra lens Wood,1828. (Gulf of Calif. to Peru)
Mitra tristis Swainson,1835. (Gulf of Calif. to Peru)
Mitra gratiosa Reeve,1845. (Galapagos)
Mitra marshalli Bartsch,1931. (Panama)
Mitra orcutti Dall,1920. (San Diego)
Mitra solitaria C.B. Adams,1852. (San Diego to Panama)

Key to west coast species of Mitra

Sculpture of fine incised lines or threads only
. Shell large, over 2 inches in length
.. Whorls somewhat shouldered
San Diego to West Mexico .... fultoni E.A. Smith
.. Whorls not shouldered
... Fine axial sculpture present
85 x 25 mm. Central America .... swainsonii Broderip
... All axial sculpture absent
.... Spiral sculpture of fine threads
72 x 24 mm. Gulf of California ...... mexicana Dall
.... Spiral sculpture of incised lines
..... Incised lines distinct
...... Incised lines punctate
56 x 19 mm Farallones to Cortez Bank ..... idae Melville
...... Incised lines not punctate
56 x 22 mm Peru and Chile .... orientalis Gray
..... Incised lines indistinct
132 x 36 mm Gulf of Calif. .... zaca,Strong,Hanna,Hertlein
. Shell smaller, about 1 inch or less in length
.. Spiral sculpture of fine incised lines only
... Incised lines over entire surface
5.5 x 2.5 mm Catalina Island .... loweana Pilsbry
... Incised lines not over entire surface
.... Incised lines confined to a subsututal band
19 x Gulf of California .... dolorosa Dall
.... Incised lines becoming obsolete on last whorl
30 x 11 mm Crescent City to Todos Santos Bay.. catalinae Dall
.. Spiral sculpture of incised lines and fine threads
... Base with increasingly strong threads
27.8 x 12.7 mm Ecuador .... salinasensis Bartsch
... Base smooth, spiral threads in a subsutural band
14 x mm Catalina to San Diego .... diegensis Dall
13 mm x 6.25 mm Los Coronados Islands .... coronadoensis Baker & Spicer

Sculpture of more than incised lines or fine threads
. Axial sculpture very fine or absent
.. Spiral sculpture of sharp cords or keels
... Keels alternating in strength
30 x 10 mm Gulf of Calif. to Central America .... effusa Swainson
... Keels of equal strength
.... Interspaces between keels smooth
60 x 20 mm Gulf of Calif. to Panama .... funiculata Reeve
Sculpture of more than incised lines or fine threads-
. Axial sculpture very fine or absent
.. Spiral sculpture of sharp cords or keels
... Keels of equal strength
.... Interspaces between keels axially threaded
..... Shell slender, attenuated
36 x 9 mm Acapulco to Panama .... attenuata Reeve

..... Shell stout, fusiform
25 x 9 mm Corinto to Panama .... erythrogramma Tomlin
. Axial sculpture present
.. Spiral sculpture of incised lines
... Surface pitted at the middle of the whorls
65 x 25 mm Gulf of Calif. to Peru .... lens Wood
... Surface not pitted
.... Axial ribs distinct, cut by the spiral lines
110 x 30 mm Magdalena Bay to Central America .. belcheri Hinds
.... Axial ribs and spiral lines indistinct
30 x 14 mm Gulf of Calif. to Peru .... tristis Broderip
.. Spiral sculpture of raised cords
... Shell elongate-ovate
.... Axial ribs extending to the canal
14.3 x 6 mm Panama Bay .... marshalli Bartsch
.... Axial ribs becoming obsolete anteriorly
..... Columellar plaits four
17.5 x 4.5 Point Loma to Panama .... solitaria C.B. Adams
..... Columellar plaits two
5.6 x 2.7 mm La Jolla .... orcutti Dall
... Shell subcylindrical,slender
15 x 5 mm Galapagos .... gratiosa Reeve

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Mitra idae Melville,1893. Farallone Islands to San Diego and Cortex Bank, Calif. Type locality, Point Loma, San Diego Co.,Calif.

This is the North American analogue of the South American orientalis Mr. A.M. Strong comments on these as follows: " The most distinctive character by which this differs from M. orientalis is that the spiral striations are minutely punctate and absent from the subsutural region. It has a black similar thick epidermis."

Collecting data: This is a very shallow water species at least in its typical form. We have dredged a few of them but none deeper than 10 fms. minus. We have taken it from rocky localities such as Point Firmin, fine specimens from the breakwater at San Pedro, the rocky rubble at Point Loma, below La Jolla (Burch); Point Loma (Dr. Fred Baker); San Pedro (H.N. Lowe); Cayucos in 10 fms. (G. Willett).

Mitra montereyi Berry,1920. Monterey to San Diego, Calif. Type locality, off Del Monte, Monterey, Calif. in 12 fathoms.

This was described and generally listed as a subspecies of M. idae . In the preliminary discussions of this species the following remarks were made by J.Q. Burch " The species I know as montereyi is not only of an entirely different shape but the aperture is far longer in proportion to the shell than in M. idae. With the books full of species we all admit classifying with the aid of an atlas why quibble about obviously different ones ? We have dredged it in 20 to 40 fathoms off Monterey and also have dredged a species off Redondo Beach that must be very close to this species if not identical. We figure both species. Perhaps further study may show our shells to be another species still more robust than montereyi. The Redondo specimens are not uncommon in 75 to 100 fathoms."

Mr. A.G. Smith writes " Agree with you that it is a good species. My most southern record is 2 specimens from 10 fms. near Cayucos. "

Dr. Joshua L. Baily Jr. comments as follows " You are quite right. This is a very distinct form. I have recently been studying the land snail Polygyra cereolus which has several quite distinct varieties which have never been named, and several others which to me look exactly alike to which a multiplicity of names have been given."

Mitra catalinae (Dall) 1919. Crescent City, Calif. to Todos Santos Bay, Lower Calif. (Burch). Type locality, San Pedro, Calif.

Grant and Gale suggest that this species may be but the young of M. idae, but we have young idae from numerous localities and certainly the species we call catalinae is quite distinct. It is one of the really common small species in the dredgings off Redondo Beach, Calif. in the gravel near 25 fathoms. The species is so common that after the first half gallon or so we quit taking them out of the dredgings. We have never seen a specimen exceeding one inch in length. In fact, one inch is a large specimen in our experience. We found it very common in the dredgings off Dana Point, Orange county, and less common off Catalina Island and off Ensenada, Mexico. It is not uncommon in littoral collecting all along the coast of southern California. We have sets from the rocky shores at San Onofre, La Jolla etc. It is rather a variable species as as might be expected it is possible to select some unusual sets out of a tray containing several thousand specimens. I suggest only that some of these may have been given names. (Burch). Mr. A.M. Strong states " I am inclined to think that this is a good species with the adult only reaching a length of a little over an inch. It is certainly very much like what one would expect of a young idae. I have never seen a shell of this size which could definitely be said to be the young of M. idae."

Mitra diegensis (Dall), 1919. Catalina Island to San Diego, Calif. (Dall). Type locality, San Diego, Calif.

Like a great many of Dr. Dall's species this one has never been figured and no one seems positive of what it is. The description reminds one of a shell that might be selected from a good series of what we know as catalinae. Mr. A.G. Smith writes of both diegensis and loweana " I suspect, as you do, that maybe these are M. catalinae . I have several lots from southern California that I have doubtfully labelled loweana but they are small and may be only the young stage of catalinae."

From the description this species is very similar to loweana with the spiral lines still stronger.

Collecting data: La Jolla (Chaney); So. Coronado Island in 10-18 fms. (Dr. Fred Baker).

Mitra loweana Pilsbry, 1931. Nautilus, vol.45, no.1, p.29. New name for M. lowei Dall, 1903. Range: Catalina Island, Calif. to San Geronimo Island, Lower Calif. (H.N. Lowe). Type locality, off Avalon, Catalina Island.

Mr. A.M. Strong states of this species " The description sounds very much like that of a young catalinae with the spiral striae a little stronger than usual and the color a little lighter as is usual in young specimens. "

However, Mr. George Willett considers it a valid species and has taken it off San Pedro, Calif. in 15-20 fathoms.

There is a paratype in the San Diego Museum from 50 fms. off Catalina.

Mitra solitaria C.B. Adams, 1852. Point Loma, Calif. to Panama. (Dall) Type locality, Panama.

This species and the species orcutti following were placed by Dr. Dall under the subgenus Thala H. & A. Adams, 1853.

Mr. A.M. Strong suggests that perhaps the Point Loma record for solitaria may have been a specimen of M. orcutti Dall.

Mitra orcutti Dall, 1920. La Jolla, Calif.

It is possible that this species may be identical with the above mentioned M. solitaria. In any event it must be exceedingly rare. No member of the club having reported even seeing a specimen.

Mitra coronadoensis(Baker and Spicer)1930. Trans. San Diego Soc. Nat. Hist. vol. 6, #6, pp 176, pl.19, fig.1. Type locality, southeastern end of Los Coronados Islands. The holotype collected by Dr. Fred Baker in 6-18 fms is in the San Diego Museum of Natural History.

The original description follows:

" Shell small, dark brown, fusiform, with four smooth, shining, cream-white nuclear whorls forming a moderately expanding, cylindrical nucleus with a blunt apex, abruptly changing to the rapidly expanding, brown postnuclear whorls; postnuclear whorls three, sculptured throughout with strong,nearly vertical,incremental lines enlarging and turning sharply to the right at their upper extremities, and with fine, equidistant, sharply incised, punctate spiral grooves, three appearing on the first whorl, four on the second,and five above the periphery and twelve on the base of the third or body whorl; sutures not impressed, margined below by a narrow line of paler brown, the base also being of a pale ashen brown changing abruptly to the dark brown of the balance of shell at the peripheral groove; whorls slightly convex, shining; aperture narrow, brown; columella with three oblique, whitish plaits; outer lip not thickened or expanded.

Altitude, 13 mm; greatest diameter, 6.25 mm; length of aperture,8.25 mm.

This species differs somewhat from the similar Strigatella diegensis Dall in general contour, in the persistence of the incised spiral lines over the base and in the coloring which is generally lighter, and presents a welldefined pale line below the sutures and a uniform ashen-brown on the base. Besides other differences, it is distinctly smaller in all corresponding dimensions than Strigatella catalinae Dall and the spire is straight or slightly concave, while in S. catalinae it is convex."

Mitra fultoni E.A. Smith,1892. Ann. Mag. Nat. Hist., Ser.6, Vol.9, p. 256, text figure,1892; Williamson, Bull. So. Calif. Acad. Sci., Vol.4, p. 123, 1905; Proc. Biol. Soc. Wash., Vol. 19, p. 197, text fig. 6,1906. (fide Grant and Gale,1931, p. 639).

Range: San Diego, Calif. to West Mexico. Type locality, Point Abreojos, Lower California, Mexico.

" This species is rather slender for the orientalis group and can be distinguished by a slight shoulder on the whorls and some minor differences in sculpture" (Grant and Gale).

Dr. A. Myra Keen advises (Per. Comm.) " Dr. Stillman Berry reports Mitra fultoni from San Diego. Grant and Gale cite the original reference and discuss the species, which apparently must now be added to our fauna".

Mr. George Willett and others have taken specimens of this species from the Pleistocene of the Baldwin Hills, Los Angeles county.

Genus Volutomitra Gray,1857. Type. Volutomitra groenlandica Gray.
" Shell ovate or fusiform, smooth, covered with an epidermis, whorls simple; columella with oblique plaits; outer lip thin, simple, arcuate."(Adams,Vol.1

Volutomitra alaskana Dall,1902. Pribilof Islands,and southward. Off San Diego, Calif. in 822 fathoms. Type locality not specified in the original description according to Dr. A.M. Keen although stated to be Pribilof Islands by Oldroyd.

Genus Mitromorpha A. Adams in Carpenter, 1865. Type (by monotypy) Mitromorpha filosa Carpenter.

" Shell small, elongately fusiform; whorls flattened, with revolving lirae, and sometimes longitudinally plicate. Aperture narrow; columella straight, slightly transversely lirate; lip acute, smooth within, scarcely sinuated posteriorly."

Grant and Gale, p. 596, make an excellent case for their theory that this group should be in the family TURRIDAE, and their conclusion has been generally accepted. However, they use Mitromorpha as a subgenus of the genus Mangelia whereas the consensus of opinion seems to be to accept the transfer to TURRIDAE but retain Mitromorpha as a genus of TURRIDAE.

A few of the points are that this group have no columellar plications which is characteristic of the MITRIDAE. They state that Thiele has shown that M. filosa, the genotype, has a Mangelia radula.

We are discussing this group here because for many years they have been placed by practically all authors in the MITRIDAE no doubt because of the mitriform appearance of the type species.

Dr. Joshua L. Baily Jr. comments on the problem as follows (Per. Comm. April, 1945) " The absence of columellar plaits has convinced me that this genus does not belong to the Mitridae. But I would not include it under Mangilia. It may be closely related but it lacks the anal notch that characterizes the Turridae. Incidentally, I notice that you use the older name, Mangelia. To me this seems to be an obvious typographical error. Mangilia had best be considered a genus just as you are using it."

Mitromorpha filosa (Carpenter), 1864. Monterey to the Gulf of Calif. (Dall). Type locality, Santa Barbara, Calif.

Grant and Gale, p. 597, give a complete English translation of the original description which in Mrs. Oldroyd's work is in Latin only with a brief outline by Tryon.

Collecting data: Not uncommon in littoral collecting in rock rubble, Malaga Cove, Point Vicente, Point Firmin, White's Point etc. (Burch); rare in Monterey Bay (A.G. Smith); San Geronimo Island, Lower Calif. and San Pedro and Monterey, Calif. (H.N. Lowe); La Jolla, Calif. ('Bristol, Lowe and Beckswith); San Diego, Calif. (Hemphill); N. Coronado Id. (F. Stevens

Mitromorpha aspera Carpenter, 1865. Monterey, Calif. to Coronado Islands (Dr. Fred Baker). Type locality, Monterey, Calif.

Collecting data: "A good species, fairly common in Monterey Bay from shore to 15 fms. It is quite distinct. Look for it in your dredgings of gracilior from Monterey" (A.G. Smith); dredged off Monterey, Calif. in 10 to 20 fms. (Burch); also dredged off Avalon, Catalina Island and off Redondo Beach, Calif. in 25 fathoms (Burch); Malaga Cove and San Pedro Calif. in 10-15 fms. (G. Willett); San Pedro and Monterey, Calif. (Lowe); San Diego, (Hemphill); La Jolla (Chaney); Ocean Beach (Bristol); Coronado Islands in 10-14 fathoms (Dr. Fred Baker).

Grant and Gale state that this species is intermediate between interfossa and crassaspera.

Mitromorpha interfossa (Carpenter), 1865. Forrester Island, Alaska (Willett) to Catalina Island, Calif. Type locality, Neah Bay, Wash. (Fide Grant and Gale).

This species was described by Carpenter as a Mangelia . The original description is in Oldroyd, vol. 2, pt. 1, p. 144 as Mangelia interfossa .

Grant and Gale state that it is very close to aspera distinguished by its larger size, more elongate shell, less convex whorls, more numerous and less nodulous axial riblets and spiral cords.

Mitromorpha fuscoligata (Dall),1871. Monterey to San Diego, Calif.
Type locality, Monterey, Calif.

Grant and Gale,1931,p.599 described Mangelia (Mitromorpha) crassaspera giving a new name to the species formerly known as Daphnella fuscoligata Dall. The new name for Dall's fuscoligata was warranted by Grant and Gale if they placed the species under Mangelia which would make fuscoligata preoccupied by Mangelia rigida fuscoligata Carpanter. However, it is obvious that if Dall's species is transferred to the genus Mitromorpha or for that matter to any other genus in which the name fuscoligata is not preoccupied we must use Dall's name and not crassaspera.

Dall's description of Daphnella fuscoligata is in Oldroyd, v.2,pt.1, p.150.

However, there seems to be considerable difference of opinion about the entire problem of this species. Mr. A.G. Smith writes (Per. Comm), " We don't follow Grant and Gale and prefer to stay with Daphnella fusco--ligata. I believe Dr. Keen uses Daphnella also. Until better evidence is at hand based on radula etc., we cite it in the Turridae."
And Dr. A.M. Keen in " Abridged Check List",1937, p. 39 placed the following note after the name crassaspera Grant and Gale (? Unnecessary innovation; see Daphnella fuscoligata).

Collecting data: Dredged off Monterey in 20 fms. on the shale, off Redondo Beach in 25 fms., Malaga Cove in 15 fms. (Burch); San Pedro, Calif. in 20 fms. (G. Willett).

Mitromorpha gracilior Tryon, ex Hemphill MS,1884. Forrester Island, Alaska ? to San Geronimo Island (H.N. Lowe). The Forrester Island record by Dall is questioned by Mr. George Willett who collected the speci--mens on which practically all Forrester Islands records are based. Grant and Gale comment." no other reference for the northern part of the range".
Type locality, Monterey, Calif.

Collecting data: In our experience this is by far the most common species of this group. Monterey,San Simeon, Catucos, Punta Banda and Arbol--itos, Lower Calif. Not uncommon in the dredgings off Monterey in 20 fms . and common off Redondo Beach in 25 fms. gravel and off Catalina Island. (Burch); Coronados Islands and Piedras Blancas, Calif. (Dr. F. Baker).

Grant and Gale state " This species is truly intermediate between filosa and aspera and interfossa. It is more slender than filosa, with a more elongate aperture and smooth outer lip, and has weak axial sculpture. M. aspera has stronger axial sculpture forming a nodulous,reticulate pattern with the spirals. M. interfossa is similar to aspera but has more numerous ribs and spirals than aspera and more rounded whorls.

Mitromorpha gracilior intermedia Arnold,1903. Monterey to Santa Rosa Island.
Type locality, Pleistocene of Deadman's Island.

Grant and Gale place this in the synonymy of M. gracilior, and comment upon the fact that Dr. Berry identified this species as living at Monterey.

Grant and Gale also place in this group the species described by Dall as Mangelia rhyssa Dall,1919. Range San Diego to Gulf of Calif.

ADDITIONS AND CORRECTIONS

Minutes #48 pp 7,8 . TETHYIDAE- Dr. Joshua L. Baily Jr. advises us as follows: " There is one point in the issue which arrived today which needs further elucidation which I am not able to give. On page 7 of #48 you give Tethys leporina Linnaeus as the type of Tethys and as the California representative you give Tethys californica. Now both of these statements are true but they are not true at the same time. Tethys leporina is the type of Tethys Linnaeus,1767, while Tethys californica belongs to the genus Tethys Linnaeus 1758. Unfortunately these two genera with the same name are not at all closely related.

Since biological nomenclature begins with the 1758 edition of the Systema Naturae, it follows that names published in this work are entitled to priority over names published in any other work. Our California animal then is correctly known as Tethys californica, and the type of this genus I do not know. I do not know if a type has ever been named, but I assume that Tethys depilans is the type. The genus to which Tethys leporina belongs has generally been called Fimbria Bohadsch, but in opinion #185 the International Commission on Zoological Nomenclature decided to throw out Bohadsch on the ground that the adoption of his names would make more confusion than it would settle. Presumably the commission knew what they were doing, but it seems to me unfortunate that the name Fimbria has to be discarded as there seems to be no other well known name available for this genus. It does not occur on our coast so we do not have to worry, but some one will have to dig up a name for it. I do'nt think anyone is qualified to do this who has not searched the literature carefully to see if any name is available. Certainly I should not undertake to name it."

Minutes #46, p.15 Cadulus tolmiei Dall,1897. Mr. A.G. Smith advises on the spelling of the specific name as follows :" I see only one item on which to comment, and that is the spelling of Cadulus tolmiei, which should have an "i" after the "m". The shell was named for the naturalist Tolmie. Dall left out the "i" in Bull. 112 but corrected it later in his " Additions and Emendations". Also I have checked the spelling against the original publication, a copy of which I have. It's a minor point but think you ought to correct it."

Minutes #45 p.17- #43 p.17 Semele pacifica Dall,1915. Carmen Island, Gulf of Calif.; Pta. Penasco and Guaymas, 20 fms.; Angel de la Guardia, 20 fms.; Magdalena Bay,10 fms.; San Juan del Sur, Nicauragua (H.N. Lowe).

This will extend the range of this species southward from Acapulco to Nicauragua.

Minutes #43, p. 18- Semele pulchra Sowerby,1832. San Diego (Hemphill); Point Loma (Bristol); San Felipe, Lower Calif. (F. Stephens); San Onofre, Calif. and Puntarenas, Costa Rica (H.N. Lowe).

Minutes #43 p 23- Tagelus californianus (Conrad),1837. Ocean Beach,Mission Beach, Alamitos Bay, Calif.; Kino Bay, Sonora, Mexico; La Paz, Lower Calif., Mexico (H.N. Lowe).

Tagelus subteres (Conrad),1837. Ocean Beach, Alamitos Bay, Kino Bay, Sonora, Mexico (H.N. Lowe).

Tagelus politus (Carpenter),1857. While we do not agree the following note from Miss V.S. Bristol of the San Diego Museum should be considered:" Dr. Fred Baker once told me that Tagelus (?Mesopleura) politus Cpr. had only been found in three places-Mazatlan,San Pedro, and the slough beyond Torrey Pines, and that it might be the young of T. californianus. Later, he told me that T. affinis will not stand. It is the young of T. californianus."

LIST OF SHELLS COLLECTED IN VICINITY OF ORO BAY, NEW GUINEA, BY LT. COL. HUBERT G. SCHENCK AND ASSOCIATES

by Dr. A. Myra Keen

Pelecypoda

Anadara antiquata (Linne)
A. gubernaculum (Reeve) var.?
A. pilula (Reeve)
Barbatia decussata (Sowerby)
Barbatia fusca (Bruguiere)
B. helblingi (Bruguiere)
Glycymeris cf. G. reevei (Mayer)
Volsella sp. (?)
Atrina strangei (Reeve)
Pinctada margaritifera (Linne)
Ostrea sp.
O. cucullata Born
O. folium Linne
O. pyxidata Adams and Reeve
Pecten inaequivalvis Sowerby
P. pallium (Linne)
Spondylus ducalis Roding
Cardita cardioides Reeve
C. variegata Sowerby
Corbicula sp. 1
C. sp. 2
Trapezium angulatum (Deshayes)
Taras cf. ethimae Melvill & Standen
Anodontia edentula (Linne)
Codokia (Ctena) divergens (Philippi
C. (Codokia) tigerina (Linne)
Divaricella dalliana (Vanatta)
Kellia sp.
Chama aspersa Reeve
C. brassica Reeve
C. cf. C. obliquata Reeve
Tridacna gigas (Linne)
T. serrifera Lamarck
Petricola (Rupellaria) fabagella Lamarck
Vepricardium multispinosum (Reeve)
Hemicardia hemicardium (Linne)
Ctenocardia symbolica (Iredale)
Fulvia aperta (Bruguiere)
Plagiocardium setosum (Redfield), n. var.?
Vasticardium flavum (Linne)
V. lacunosum (Reeve)
V. nebulosum (Reeve)
V. rubicundum (Reeve)
V. subrugosum (Sowerby)
V. transcendens (Melvill & Standen)
Dosinia cretacea Reeve
D. laminata (Reeve)
D. juvenalis (Gmelin)
Callista lilacina (Lamarck)
C. phasianella (Deshayes)
Sunetta effossa (Hanley)
Lioconcha hebraea (Lamarck)
L. trimaculata (Lamarck)
Pitar cf. P. affinis (Gmelin)
P. erubescens (Reeve)
P. pallescens (Sowerby)
P. pellucida (Lamarck)
Timoclea costellifera(Adams & Reeve)
T. cochinensis (Sowerby)
T. imbricata (Sowerby)
T. n. sp., aff. T. scabdularis(Hedley)
Venus toreuma (Gould)
Dosinia puerpera (Linne)
D. reticulata (Linne)
Tapes variegata (Sowerby)
Paphia textile (Gmelin)
Gafrarium dispar (Dillwyn)
G. marmoratum (Reeve)
G. pectinatum (Linne)
Circe sp. (juvenile specimen)
Mactra attenuata Deshayes
M. (Mactotoma)depressa Spengler
M. cf. M. incarnata Deshayes
M. incerta Smith
M. abbreviata meretriciformis Reeve
Cardilia semisulcata Lamarck
Standella (Eastonia) capillacea (Desh)
Asaphis cf. A. taheitensis (Reeve)
Donax bicolor Lamarck
D. scortum Linne
D. semisulcatus Hanley
Gari corrugata (Deshayes)
Solecurtus philippinarum (Dunker)
Soletellina (Psammotaea) crassula (Desh)
S. (P.) subradiata (Reeve)
Tellina sp. (?)
T. foliacea Linne
T. lanceolata Gmelin
T. cf. T. perplexa Hanley
T. planissima Anton
T. remies Linne
T. staurella Lamarck
Strigilla cyrenoidea Hanley
S. (Aeretica) n. sp.
S. (A) cf. S. tomlini Smith (n. sp.?)
Apolymetis turgida (Deshayes)
Siliqua radiata (Linne)
Solen gracilis Philippi
Aloidis tunicata (Hinds)
Cryptomya (Tugonella) decurtata (Reeve)
C. (T.) divaricata (Reeve)
C. (T.) elliptica Adams
Martesia striata (Linne), var.

Cephalopoda

Nautilus pompilius Linne
Spirula spirula (Linne)

Gastropoda

Haliotis varia Linne
Diodora galeata (Helbling)
D. cf. D. proxima (Sowerby)
Acmaea flammea (Quoy & Gaimard)
Stomatella cf. S. lyrata Pilsbry
Trochus maculatus granosus Linne
T. niloticus Linne
Phymotis phymotis (Helbling)
Angaria laciniata (Lamarck)
Liotia peronii (Kiener)
Turbo setosus Gmelin
Phasianella cf. P. graeffei Dunker
Nerita albicilla Linne
Neritina auriculata (Lamarck)
N. (Neritodryas) cornea (Linne)
N. coromandeliana Sowerby
N.(Vittina) turrita cumingiana Recluz
N. (Neritina) pulligera (Linne)
N. (N.) squamipicta Mousson
N. (Vittina)turrita Recluz
Neritina (Vittoida) variegata Lesson
N. waigiensis Lesson
Septaria tessellata (Lamarck)
Neritopsis radula (Linne)
Littorina undulata Gray
Architectonica perspectiva (Linne)
Philippia hybrida cf. var. australis (Hanley)
Modulus tectum (Gmelin)
Litiopa melanostoma Rang
Potamides palustris (Linne)
Cerithium asper Linne
C. kochii Philippi
C. obeliscus Bruguiere
Pyramidella terebelloides A. Adams
Natica alapapilionis Gmelin
N. columnaris Recluz
N. mamillae Gmelin
N. melanostoma Gmelin
N. tessellata Philippi
Sinum laevigatum (Recluz)
Strombus aurisdianae Linne
S. isabella Lamarck
S. luhuanus Linne
S. succinctus Linne
S. urceus Linne
S. variabilis Swainson
Lambis lambis (Linne)
Trivia oryza (Lamarck)
Cypraea (Monetaria)annulus Linne
C.(Mauritia) arabica (Linne)
C. (Lyncina) carneola Linne
C. (Pustularia) cicercula Linne
C. (Erosaria) eburnea Barnes
C. (E.) erosa Linne
C. (E.) gangrenosa Solander
C. (E.) helvola Linne
C. (Mauritia) intermedia Gray
C. (Errones) interrupta Gray
C. (Luria) isabella Linne
C. (Lyncina) lynx Linne
C. (Palmadusta) microdon Gray
C. (Monetaria) moneta Linne
C. (Nuclearia)nucleus Linne
C. (Luria) pulchra Gray
C. (Talparia) talpa Linne
Amphiperas lactea (Lamarck)
Cassis (Phalium) areola (Linne)
Tonna costata maculata of authors
-- T. dolium (Linne)
T. olearia (Linne)
Distorsio anus (Linne)
Bursa bufonia (Gmelin)
Pythia scarabaeus (Linne)
Faunus ater (Linne)
Thiara sp.
T. sp. cf. T. granifera lineata (Gray)
Murex ternispina Linne
Magilus striatus (Ruppel)
Thais persica (Linne)
Drupa (Morula) muricina (Brod.)
D. (M) concatenata (Lamarck)
Pyrene pardalina anaitis (Duclos)
P. fulgurans punctata (Lamarck)
P. versicolor (Sowerby)
Cantharus undosus (Lamarck)
Phos senticosus (Linne)
Nassarius albescens (Dunker)
Oliva annulata (Gmelin)
O. funebralis blanda Marrat
O. oliva (Linne)
O. reticulata (Roding)
Mitra cf. M. ferruginea Lamarck
Conus ceylanensis Hwass in Bruguiere
C. figulinus Linne
C. geographicus Linne
C. glans Hwass in Brug.
C. lithoglyphus Meuschen
C. miliaris Linne
C. monachus Linne
C. piperatus Dillwyn
Terebra (Hastula) aciculata (Lam.)
Acteocina cf. A. singaporensis Pilsbry
Bulla cylindrica (Helbling)
Vesica adamsi (Menke)
V. ampulla (Linne)
Philine cf. P. angasi Crosse & Fischer
Solidula solidula (Linne)

Siphonaria cf. *S. sipho* Sowerby
Papuina tayloriana (Adams & Reeve)
Helicina aruana Pfeiffer

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Harold Harry Ph M 1/c, 8th division, U.S.S. Algol, AKA 54, Fleet Post Office, San Francisco, Calif. Home address, Rt.2, Box 222,Shreveport, Louisiana.

" My recent trip to the Western Pacific was a voyage in the most exact sense of the word; for, while I was several months at sea, I was only a few hours on any shore, in a position to conchologize. I was only *near* most of the places visited, within a few hundred yards, not *at* them. However, I have resigned myself to be content with even that, realizing that even so little experience was better than a picture: for I could see them in their real color and perspective, at different times of day, and feel their breezes, smell their air. There was another percept too, an essence which did not seem to come by any of the other senses; I was particularly conscious of this climatic essence just at Christmas time in the Solomons- a disagreeable essence, the very opposite of the season one usually attributes to Christmas. It was horribly torrid. The naturalness of Saipan was something quite different; overlooking the artificial, of which there was plenty, and in its most repugnant form- war, it has an essence that is strictly idyllic, balmy.

Even as the ship approached Saipan, I was conscious of this essence by the turquoise blue of the calmer water, the emerald green of the gentle slopes of the island, and the mist about the low peaks. It seemed a perfect fusion of tropic and pemperate regions. Inside the coral reef, which formed a natural harbor, one could see fathoms into the water, but not distinctly, so that the coral of the bottom appeared as patched of ultra-marine and white . While in this harbor the ship was occasionally visited by vagabond butterflies and dragonflies, a good mile off shore. Some of these lit upon the ship, and I thus caught two species: one a *Papilio*, the other more surprising: the Monarch Butterfly, so common in the eastern United States.

My collection of marine specimens, here as elsewhere, was limited to beach-combing; the material is all of the commonest brought back from the Western Pacific, among which is *Tellina rugosa*, *Turbo cetosus* Gmelin, *Trochus obeliscus* Linne, *Venus purpurea* Linne, *Natica marochiensis* Gmelin, and others. Judging from the dates of these authors, these species have always been among the commoner things brought back from the Pacific.

Of the non-marine species I was able to get a better collection, though this too is sadly short of what it might have been, had time allowed. I was able to collect a small vial-full of microscopic pulmonates, from only a couple of hand-fulls of sand; this had collected in the groove of a leaf of a common plant, resembling the century plant. It was more surprising, as the plant grew only a few feet from the high tide line. It was also just a few feet from a ruined enemy gun emplacement, just to keep us in touch with reality. Also taken was a large *Succinea*, though none were found alive; two species of *Opeas*, perhaps imported; and several unfamiliar tropical snails, the identity of which I have not yet determined. In a fresh water slough, which was choked with pale-blue blooming water hyacinths, there was a species of *Lymnaea* which was very numerous.

The most interesting find of all was a large *Achatina* , which was literally everywhere: under decaying vegetation, in grassy, open spots, and climbing banana trees. The shells of it were even common on the beach, washed in by the tide, and frequently shells were found inhabited by the terrestrial hermit crab of the island. The shell of this species proves identical with a shell in the Burch collection, labelled *Achatina fulica* (Fer.). My largest shells measure 9 cm. Alt.; the nuclear whorls are white, polished. The next few whorls show vague microscopic sculpturing consisting of rounded transverse growth striae, closely spaced, and cut by numerous spiral lines. This sculp-

-turing is very indistinct, but present from the later nuclear whorls to the penultimate whorl. The penultimate whorl and body whorl show only irregular transverse growth striae, which are numerous and often incomplete; they are wrinkled and puckered, showing the vicissitudes of later growth. On about the third whorl from the apex, the white color is augmented by thin, dim lines of reddish-brown, which run transversely; these become more prominent, larger and flame-shaped as the whorls increase, and gradually the white is excluded. On the last whorl of mature shells the white is completely absent, and the color is variegated brown, of several shades. In weathered portions of the shell, the brown color may assume a purple tinge, and the white color on the body whorl of immature specimens is replaced by olive. This species has already reached prominence in the Minutes, as being a pest of the rubber crop in the Malay peninsula. The above mentioned specimen in the Burch collection is from Mauritius, and Mr. Burch informs me that the species is indigenous of India. It might be well to watch for further records of migrations, and to consider it becoming a pest in other tropical countries, especially where rubber is grown. I can not say that it has any economic significance in Saipan, though certainly it was sufficiently numerous to merit attention in this respect. As many as a dozen could be found under a single fallen banana leaf.

All of my land excursion on Saipan was limited to a small portion of the flat, coastal area, just north of the destroyed twon of Gerpan.

Noumea, New Caledonia is the only other place of which I can speak with even a modicum of familiarity. I was able to go ashore here several afternoons, and, after enjoying this vestige of civilization, to explore the near-by beaches. Noumea is situated on the western side, near the southern end of the island, which is directed north-west by south-east. This portion of the island was dry, like Southern California; in fact, everyone with whom I spoke about rain had the same bland, disinterested look that one is apt to meet in regards this subject in the Golden State. But New Caledonia does have rain, 40 inches a year according to the " Pacific Island Year Book"; the important factor is that the rain is unequally distributed. I took one trip inland, a short way from the town, and was impressed by the ubiquitous Niaouli trees, which formed a sort of scrub forrest of wide extent. It is related to the Eucalypti and the forest was very reminiscent of the copse of Eucalyptus to be seen in California-the leaf covered forest floor; the shade but not shadow; the loose,dangling bark; the scarsity of undergrowth; and the dusty-green foliage.

It was surprising to find cactus growing in this part of the world; there were two species of the opuntia-type, which may have been imported, but which were firmly established about the twon. One of them, very obviously a prickly-pear, was growing just behind the high tide line.

The town and polulace seemed very picturesque, with emphasis on the French influence; the houses, in the more congested areas were built directly on the sidewalks, with wooden shutters on the windows, a small overhanging balcony on the second story, and a formal garden of tropical plants in the small patio in the rear. I was much reminded of New Orleans, even conchologically for the single land snail which I found seems, on superficial scrutiny , to be a Bradybaena. It may be the same which occurs in Jackson Square of our southern city; and the Bradybaena which I found in Noumea was in the public square, in the very center of the town. We may note in passing that, not only do imported snails have a tendency to remain close to human habitation, presumably having been stowaways to human migrations, but that public parks of old cities,and especially sea port cities are excellent places to search for exotics.

The whole island is mountainous, with igneous and metamorphic rocks much in evidence; this presented portions of rocky beaches, as well as the usual smooth stretches of sand usually associated with tropical isles. Of the marine collecting in New Caledonia, I was more fortunate than at Saipan. The rocky portions of the intertidal zone produced siz species of Nerita, as well as two species of Littorina, a Thais and several of the related genera as covered in Maxwell Smith's recent tome, chitons and limpets. While turning over a rock in the intertodal, I came upon a single specimen of a drab, grey-colored nudibranch, or so it seemed; there was nothing to put it in except a broken fragment of a bottle, with scarcely enough water to cover it. But surprisingly enough the thing lived in the bottle fragment for the rest of the afternoon, all of several hours, while I continued to comb the beach. This was rather obliging of a fastidious animal like the sea slugs are wont to be. Even more surprising was the nonchalance with which it crawled about the palm of my hand. Closer examination showed the creature to be an Oncidium, or close to that; this is one of the true Stylommatophor--ous pulmonates which is marine. Dr. Gregg informs me that the group is represented in California, but the larger species are to be found in Mexi--can waters. My specimen had only a single pair of tentacles; these are tapering, rounded, of moderate length, and slightly bulbed at the terminus, with an eye spot on the bulb. These tentacles were invaginable. Furthermore the thing displayed a pneumostome, in the median plane and posterior, just under the mantle edge, and over the anus. To be or not to be a pulmonate, such must be his quandry. Back at the ship I placed it in a pint jar of salt water , in which it seemed very content, and survived for several days. It would crawl to the surfaceand open the pneumostome, but I never observed it with the pneumostome open under water, and indeed it was quick to close this aperture when the jar was disturbed, evidently to avoid the entrance of water.

A few days later I was again in this rocky strip of littoral zone, where I had found the Oncidium. While turning over a stone I was surprised to see a snake, a true ophidian, worming its way among the rocks. This was about a foot long, and slightly larger in diameter than a common pencil. The head was small, the neck not distinct, and the eyes minute, with rounded pupils; its color was of narrow, alternate bands of black and light blue. A remarkable feature was the tail, which was flattened in the median plane, so that it was paddle shaped. This was one of the Hydrophinae, the true sea snakes. They are related to the cobras and coral snakes, and are like--wise venomous, though the specimen which I found that afternoon made no attempt to strike, even when gently restrained with a stick, or cautiously handled. I have read somewhere that these snakes are no great menace, and that most casualties result from sorting net-fulls of fish, when an unwary fisherman is occasionally bitten. While the ship was anchored in the harbor, we would see as many as three a day, swimming at the surface of the water. These were larger than the one just described, about three feet long, and colored tan and black. Anyway, we need not worry about snakes while combing American beaches.

In the same rocky stretch of beach (very productive, you may note) was to be found a most unusual rock oyster. I consider it unusual for sev--eral reasons: it was growing in a littoral zone of maximum salinity, and exposed to open surf; its method of growth was peculiat too, for the attach--ed (left) valve was frequently re-secreted by the mantle , on top of for--mer valves; thus in the course of time the whole surface of the oyster colony was raised considerably. There was formed a small cavity between the subsequent left valves, at the point of greatest concavity. This was a small oyster averaging about 1" from hinge to ventral margin- the greatest dimension of the right valve. The edges were scalloped and rounded, and the cavity of the left valve was conical, and as deep as the dorso-ventral measure of the shell. Often the line left by the umbo of the advancing left valve would measure several times the shell's heighth. The surface of the colony was relatively smooth, flat; the individuals did not project in all directions , as is found in oyster clusters in the states. Thick masses of calcareous substance was thus formed on the rocks, and constituted a micro habitat all its own, with the usual oyster associates: neriads, barnacles, algae, Mytilus , and a small boring clam like Lithophaga, among the old beds. The color of the surface was white, with pink, red and purple on the more worn places.

New Caledonia was in one respect very prominent with Cephalopods: I found a fragment of a Chambered Nautilus on the beach, and bought a beautiful perfect specimen in a curio shop in town. No doubt good specimens could have been found on the beaches farther from Noumea. Also in beach combing I found cuttle fish bones, and *Spirula*. Catching live *Octopi* was the most exciting of all. It happened that we had a light suspended over the side of the ship one night while anchored in the harbor. As might be expected photonopic things began to collect in legion, all sizes from microscopic to pilot fish three feet long. Among these larger things was a species of small *Octopus* which I managed to catch by throwing a plankton net beyond them and quickly dragging it in. These I have preserved for future study. In swimming these devil fish looked something like a bull frog in size and form, though there was no corallary for head and anterior appendages; the tentacles were drawn behind in two diverging groups, and their movement was slow. But no one would mistake them for bull frogs; besides being marine, they were also a delicate shade of pink when alive.

Noumea presented some strange facts, right enough. Another surprise I found in a mud flat where I had gone in search of *Pythia* ; I had become interested in the anatomy of this group after collecting them in the Admiralty Islands, but my material was nearly exhausted when I was taken with a ray of hope on seeing some shells in a box of mixed shells in one of the town shops. Incidentally I would be very pleased to correspond with anyone about this group (anatomy and distribution), and also the *Neritidae*. But I was telling of the mud flat; this was about in its inland extreme, fed by a bit of the town's sewage; doubtless it was brackish among other things, in the upper portion. As it was impenetrably overgrown with a bulrush fully twelve feet high, I limited my search to the lower region nearer the sea. Here, the terrain was more passable. The fresh water influx from the town maintained a small channel in the beach of the flat. At that part was a low grove of mangroves with sturdy aerial roots and surface branches which allowed one to walk safely above the substrate, be it sewage, mud or incoming tide. To reach the mangrove thicket one had to first cross a wide margin of mud which was devoid of all macroscopic vegetation; it was evidently only covered by the higher tides, or after an occasional torrential rain, which really does happen in Noumea, all kidding aside. At any rate the mud was very dry and fissured, and walking was easy. Every few yards was located an assemblage of astinating *Potamides*, possibly *P. telescopium L.*; many had sought the sanctum of the fissures when the moisture retreated. As you doubtless know, *Potamides* is a large Cerithium-form, beautifully colored, dark brown and heavy. They may be 3½ inches tall, with a base of over 1½ inches. I proceeded to the mangroves, there to search for *Pythia* ; after taking note of the many fiddler crabs and marsh crabs (*Uca* and *Sesanma*, or near), and batting a few mosquitoes, I was taken aback at seeing a small fish hopping about on the mud and snapping insects. These were similat to Golues , at least on the closest examination which they would allow (several feet); they pulled themselves along by aid of the pectoral find. These would not allow me to approach closely, for I was dressed in white, and the day was very bright; but if I sat still, several would hop from the water and pursue their happy task of insect hunting ashore. When frightened they would dive for the closest puddle, and swimming under water or richocheting along the surface would make away. Occasionally when startled they would hop to one of the mangrove roots and up it for several inches, clinging there with the pectoral fins; this is why they are called " the fish that climb trees" in Believe it or Not and the like. I have heard that these fish may be caught by coaxing them with a bit of Uca on a string.

Yet no Pythia. Instead I contented myself with two other species of Auriculidae, and a Littorina which was over an inch tall.

There were only two other places at which I did any collecting, and then for only a few hours at each. Necessity dictated a resignation to other things than mere collecting; this has developed into a study of the anatomy of several of the Pythia, the Neritidae, the Achatina , and while none is yet a conclusion, all progess steadily."

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Lieutenant Colonel Hubert G. Schenck- Dr. A. Myra keen sends the following note about the present activities of Colonel Schenck or Dr. Schenck to most of us:" Dr. Schenck was transferred to the Engineers recently and is now doing geological work in the Philippines. He writes that it is a new experience to do geology with a cocked pistol in one hand, but that is necessary where pockets of Japanese may be encountered at any moment."

Professor Carl L. Hubbs, The Scripps Institution of Oceanography, La Jolla, Calif. " I had meant to send you a token check for the " Minutes", but inquiry of my wife and treasurer discloses that I haven't done so, Although I'm far from conchology I do find items of scientific and personal interest in your publication. I even find it impossible to resist the temptation to collect mollusks occasionally. I've brought in a lot of specimens of Mytilus edulis for Dr. Coe; some of the semi-fossils from about Salton Sea etc. I found a perfect Cypraea spadicea, still pigmented, in a Pleistocene deposit at Torrey Pines and hope to collect other species in the deposit in a few days."

Dr. Joshua L. Baily Jr., 4435 Ampudia St., San Diego, Calif. " Enclosed please find check for $10.00 of which half is to pay for the Distribution al List of Pelecypoda,and five to pay for the notes that will be coming during the ensuing year. I am glad that you have fixed a price on them,and hope that you continue to keep me supplied with everything you turn out."

Mr. A.S.Koto and Adele Koto, 822 Park Ave., Beloit, Wisconsin. " We always enjoy the " Minutes", and both Dad and I look forward to receiving them. I am inclosing a couple dollars to help defray the expense of this. You are doing a fine job. ...... Dad was at Bradenton Beach, Fla. this winter, and came home about a monthago. I think that he did very well at collecting this year, but there is still a lot we havent identified. "

Mr. Carl I. Thomas, 262 N. Pine St., Orange, Calif. " I think the contents of the " Note" on the Minutes of the Conchological Club states something that should have happened a long time ago and is no more than " the thing" only I doubt if it is enough. Inclosed check for $5.00, $2.50 for the Minutes and the other as donation and dues. War keeps me going as others but I am more than casually interested."

Dr . W.P. Woodring, U.S. Geological Survey, Geology Dept., Univ. of Calif. Los Angeles 24, Calif. We have reason to feel very flattered by the following note from Dr. Woodring:" Your letter of May 21 and the copy of No.47 of the Minutes were received shortly after I mailed my letter of the same date requesting the very number you kindly forwarded. Today I received the Number 46. Following up your generous offer, I would be very glad to have any additional back numbers you can spare. Your informal publication is indispensible to anyone interested in Tertiary,Pleistocene, and Recent West Coast mollusks. "

Mrs. Mary Bormann, 4331 Vermont St., Long Beach, Calif. Mrs. Bormann writes for possible advice to a friend of hers who is making a trip down the coast of Mexico in a fishing vessel this summer and is interested in dredging and diving. Your editor hastens to reply with many suggestions including one that they might need another cabin boy or something.

Corrections to the List of Shells Collected in Vicinity of Oro Bay, New Guinea, by Lt. Col. Hubert G. Schenckand Associates:-

Pelecypoda-- family Veneridae

Lioconcha hebraea should be Lioconcha sowerbyi (Deshayes)

Timoclea aff. scandularis should be Timoclea bella (Jonas)

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Mr. A. Sorensen, 247 Granite St., Pacific Grove, Calif. " In case you think that the readers of the Minutes will be interested in reading the list of mollusks that can be collected in one short visit to a small island in the Kwajalein Atoll, Marshall Group, you may use the enclosed list.

My grandson, Leroy Sorensen, with the Naval Air Transport Service brought me this fine lot last week. He had collected them on the reef in five hours and fully ninety percent were alive when taken. He had collected here with me at Pacific Grove hence it was nothing new to him, and he must have made good use of his time."

Species of shells from Kwajalein, Marshall Islands collected by Leroy Sorensen, May,1945.

Conus coronatus Gmelin
Conus catus Hwass
Conus lividus Hwass
Conus capitaneus Linne
Conus milos Linne
Conus ceylonensis Hwass
Conus distans Gmelin
Vasum ceramicum Linne
Vasum turbinelum Linne
Trochus obeliscus Gmelin
Trochus tubiferus Kiener
Bursa bufoniun Gmelin
Bursa caelata Broderip
Turbo argyrostomus Linne
Cerithium nodulosum Bruguiere
Cerithium sinensis Gmelin
Drupa horrida Lamarck
Drupa digitata Lamarck
Drupa ricinius Linne
Strombus lentiginosus Linne
Strombus urceus Linne
Strombus variabilis Swainson
Mitra litterata Lamarck
Mitra chrysalis Reeve
Cymatium chlorostomum Lamarck
Cymatium tuberosum Lamarck
Cymatium transguebaricum Lamarck
Cassis vibex Linne
Sistrum tuberculatum Blainville
Sistrum morus Lamarck
Nassarius thersites Bruguiere
Hindsia (Nassa) nivea Gmelin
Jopas (Thais) sertum Lamarck
Cypraea lynx Linne
Cypraea isabella Linne
Cypraea arabica Linne
Cypraea tigris Linne
Cypraea caput-serpentis Linne
Pterocera chiragra Linne
Barnaea dilatata Souleyet
Barbatia decussata Sowerby
Navicula boucardi Jousseaume
Lima lima Linne
Siphonaria recuana Pilsbry

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" I was glad to see in the last Minutes that you have finally decided to fix a minimum cost to the Minutes. It was high time. I had always wondered how you managed to scrape along with what came in. Enclosed find my check for $3.00..."

In the #48 copy of the Minutes (May '45) you reprint a clipping from the Seattle Times about an old shell collector, now on Okinawa who has been very helpful to our military forces. It was sent you by Mr. W.J. Eyerdam who does some speculating about the mans identity. I also had the same article which I clipped from a San Francisco paper,and sent it to Ted Dranga in Miami, Fla. For if anyone would know the man it would be Ted whose old home was Honolulu. The enclosed reply from him confirms my opinion, but it does not give his name as Ted evidently respected his desire to remain unknown" Ted's note about the matter follows:

" The newspaper clipping is very interesting. Unlike most newspaper articles, it is remarkably accurate-- in fact I don't think there is a single incorrect statement in the entire article. I know him very well, have been collecting with him and visited him a couple of times in Japan . I have not seen him since he arrived in the United States after his imprisonment in Japan, but I have had correspondence with him and I knew he was out in Okinawa before I saw your clipping. He is a very excellent malacologist and a remarkably good collector. However, he has no collection of his own, as he sends everything to his brother-in-law in Honolulu, as is stated in the clipping. I dont recall whether or not you purchased from me when in Miami any shells from Japan. If you did, most of them had passed thru his hands."

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Princeton University, The Library, Princeton, New Jersey. We are honored to send this fine old institution a file of our papers and place them on our permanent mailing list.

Mrs. Edward P. Van Duzea, P.O. Box 285, Alameda, California. Mrs. Van Duzen is interested in purchasing shells. Members having duplicate s for sale may write her.

Mr. E.J. Post, 609 W. Emma St., Tampa 3, Florida. We were glad to have a letter from our good member, but isnt it about time you were getting started back to California and home?

Heathcote M. Woolsey, Green Pastures, Kent, Conn. " I am very glad to enclose herewith my check for $2.50 for the minutes of the Conchological Club of Southern Calif. I've enjoyed each issue that you have been good enough to send me and the total issues kept on file are of very real value. I wish we had something the counterpart of it in the East."

Earl C. Huffman, 356 Stanton St.,Pasadena 3, Calif. " I am sending you a small parcel of shells and it will be greatly appreciated to have them correctly identified. The fresh water specimens I discovered by chance inn the Arroyp Seco under the Colorado Street bridge on May 10,1945 while on another mission. The stream is but a trickle as it is only the seepage water from behind Devil's Gate Dam two miles further up the Arroyo. I discovered a movement in the mud and tried to show the other party, knowing what to expect on investigation. To an untrained eye it would have gone unnoticed as he couldnt see anything alive in the tiny objects. This is why so much is overlooked by beginners. Hadn't the time or might have found more- will try again in a week or so and by then they may be a bit larger. I sent you all but one of each taken, but don't return them as I shall get down there again. The growth lines appearas a series of striped but I believe them all to be of the same species. The shells from Pyramid Lake were recently given me by a friend so don't know anything about them. "

According to Dr. W.O. Gregg, our final authority on fresh water species, the shells from under the Colorado Street bridge are:

Physa osculans Haldeman and Helisoma tenue californiense F.C. Baker.

The Physa from the Salton Sea is Physa humerosa Gould, which Dr. Gregg says is but an ecological form of Physa osculans Haldeman.'

The small specimens from Pyramid Lake, Nevada are Pyrgulifera nevadensis (Stearns),1883.

Mr. Roy L. Morrison, 3745 Grim Ave., San Diego 4, Calif. " Enclosed find check for $2.50 for a year enrollment on your mailing list. Took in a good tide the 30th at Mission Bay, found quite a quantity of Haminoea vesicula (Gould) at the clam bed north of the bridge. I had previously found H.dalli and H. vesicula on the east shore. Haminoea vesicula have been quite common at the bridge all winter and spring."

Professor J. Harlan Johnson, Colorado School of Mines, Golden, Colorado. Thanks for the checkand the compliment " We are interested in your work and hope you will be able to continue it."

Walter F. Webb, 202 Westminster Road, Rochester 7, N.Y. We have a post card announcing Mr. Webb's new edition of his shell books. He has over 1000 illustrations of marine shells. The book sells for $2.50 and should have a very large sale at this time. He has another publication also at $2.50 dealing with the shells of North America north of Mexico.

Professor Trevor Kincaid, University of Washington, Seattle, Wash. " I am glad to learn that my material was of some value to you in putting together your very useful contribution to our systematized knowledge of Pacific Coast mollusks. It is to be regretted that our opportunities for collecting deep water material have been so completely curtailed during the past several years, but we are looking forward to an M-day, the M standing for Mollusca, when we can buy up an unused mine-sweeper and get down to business in a big way.

I will be interested to see your analysis of the fresh water forms. I have about a peck of material along this line, but unfortunately I have preserved only the "shells", whereas it seems evident that the modern specialists, like the Chinese soothsayers, must have the entrails of the animal before they can cast a horiscope and determine the probable specific identity of the animal.

The growth of the minutes has outstripped my proportionate share of the cost of getting them out, so I am putting a five-spot in the "kitty" .

Mrs. E.W. Boerstler,P.O. Box 494,Corona del Mar, Calif. " At present we are not doing any collecting but will be on the job when day tides are good again". Thanks for the check.

L.M. Wright,CEM, U.S. Navy, 418 Plaza Hotel,Miami, Florida. The box of shells sent us by Mr. Wright were distributed among the members at a recent meeting and greatly appreciated. Any collector on the other coast having ample duplicates who cares to send a lot to the club will receive our sincere thanks.

Miss Edna N. Wilson,718 Capistrano Place, Mission Beach, Calif. " I am enclosing a money order for $10- $5 for a copy of Distributional List,Pt .I Pelecypoda. I can make good use of it as I am too lazy to look up all that in the other papers, but I am not too lazy to be on hand for all the early morning tides in summer here at the beach and those in May this year have been particularly joyful".

Incidentally Miss Wilson had found more of the very rare things washed up on the beaches than anyone I have known. I dont know her secret but think it may be a careful examination of washed in kelp holdfasts.

Miss Miriam Shepard,Box 164,Route 2, Portland 10,Oregon. "I'm hastening to enclose a check as I should not like to miss a copy of the minutes. I'm glad you've suggested an amount for the fund, because it was hard to guess how much was needed."

Mr. S.G. Skinner,630 Almond,Long Beach 4, Calif. " Accept my congratulations on your decision to make a charge for the shell club minutes;I think it to be a move in the right direction; paper,postage,and effort will be saved. The enclosed is a token of appreciation for past favors, and I'm asking that my name be crossed off the subscription list,as my health and strength are failing,and in all probability shell collecting will soon become only a memory- a pleasant memory.

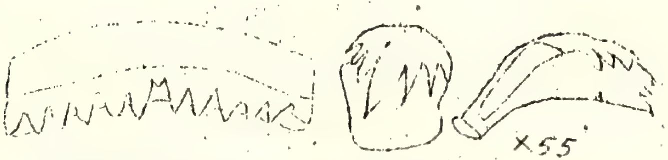
"The Carm of Life lies in the thought that we live in the memory of our friends".

Mr. Skinners past support in times of need certainly make him some sort of a life time member. At any rate his name will be on any subscription list the present editor has anything to do with.

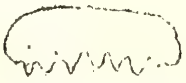
Professor Louis Brand, University of Cincinnati, Cincinnati, Ohio. "Enclosed is a check for $2.50 to cover the cost of the Minutes for a year;I feel sure you are right in charging a definite sum for this valuable publication."

Radulas of West American Mollusca

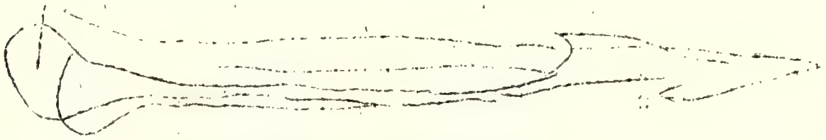
Here are drawings of a few radulas from our collection of species that we have covered in the Minutes. I have also included a few from Tryon and one from Pilsbry and Lowes paper on the southern fauna. In all of these the tooth to the left is the central tooth and those to the right are the laterals and marginals. These are duplicated on the left but are not shown. For a discussion of the parts and significance of the radula see Minutes #42, page 23. Thomas A. Burch



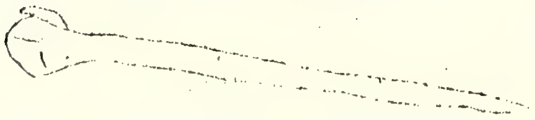
Vesica gouldiana (Pilsbry)



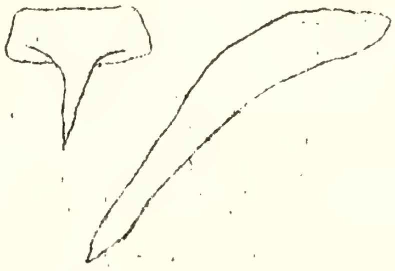
Marginella elegans Gmelin
(Tryon S.S. Conch.)



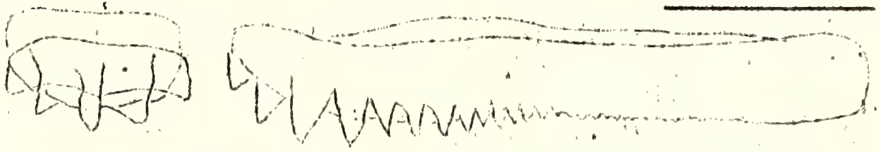
Conus californicus Hinds



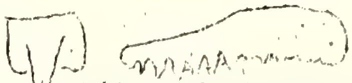
Moniliopsis incisa (Carpenter)



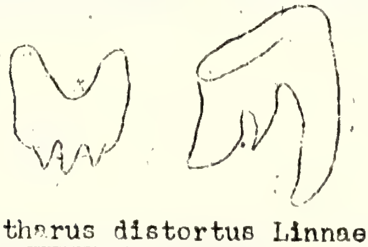
Pseudomelatoma torosa Carpenter



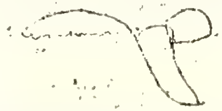
Mitra montereyi Berry- Redondo Beach 75 f



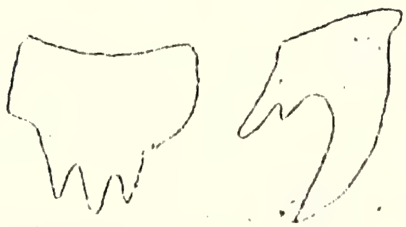
Mitra adusta Mart.
(Tryon)



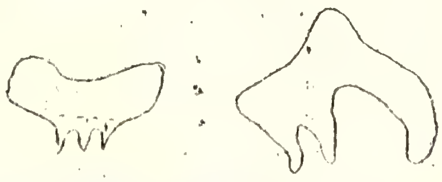
Cantharus distortus Linnaeus
(Tryon S.S. Conch.)



Oliva reticularis Lamarck
(Tryon S.S. Conch.)



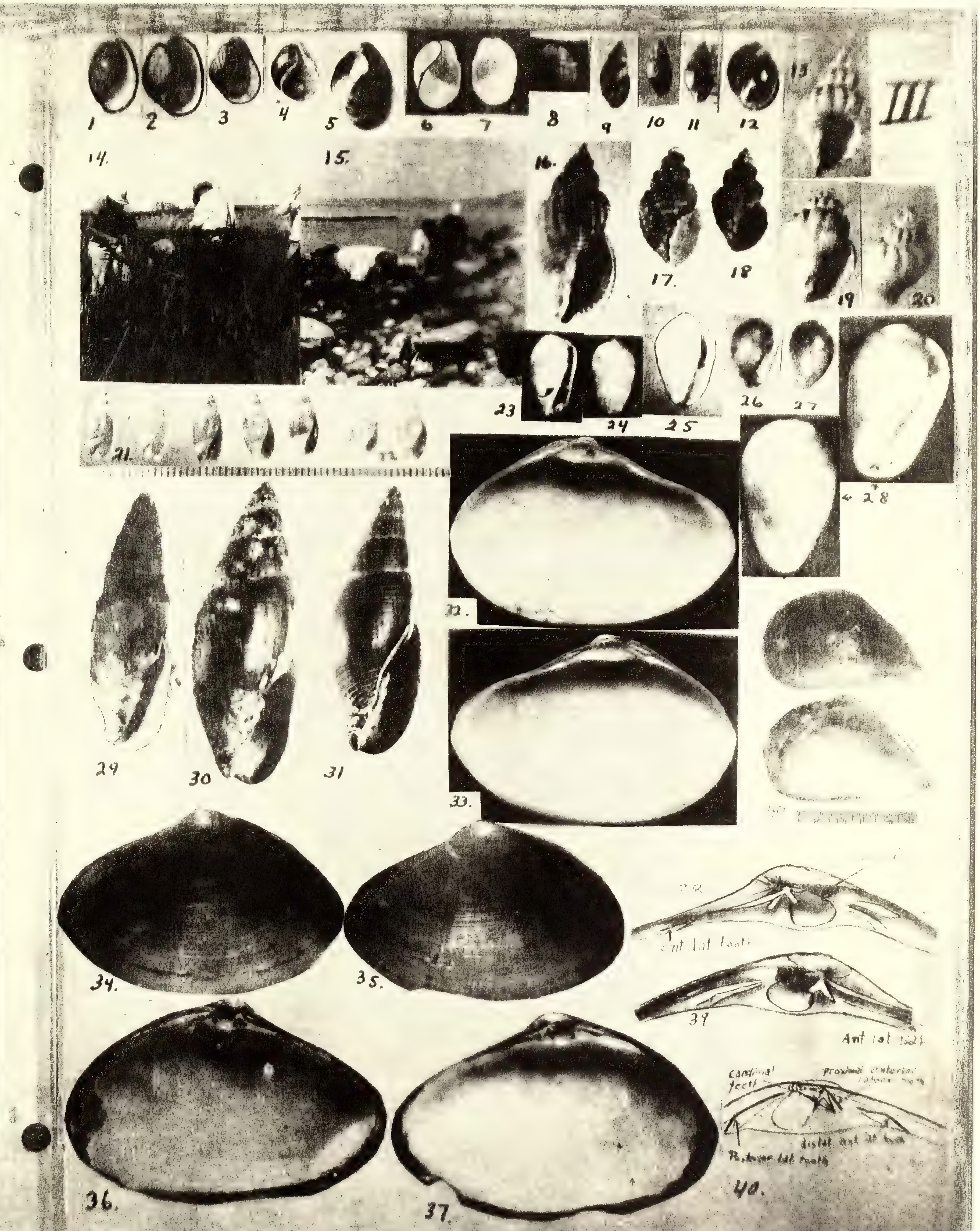
Engina strongi Pilsbry & Lowe
(Pils. & Lowe)



Kelletia kelletii Forbes
Redondo Beach

Explanation of Plate

1. Vesica quoyana (Dall),1919. Sowerby,Thes. Conch. vol.2,pl.123,fig.71,1850
2. Haminoea vesicula (Gould),1855. Martini & Chemnitz,1806,vol.1,pl.15,f.23
3. Haminoea virescens (Sby.),1833. " " " " f.16
4/ " " " Sowerby, Thes. Conch., vol.2, pl.124, f. 83
5. " " " Newport Bay,Calif. (Burch) x 1.3
6. Philine californica Willett,1944. Redondo Beach,Calif.(Burch) typo
7. " " " " " " "
8. " " with animal crawling. See also drawing in Min.42 BP
9. Phytia setifer Cooper,1872. Terminal Island, Calif.(Burch) 8/36 x 2
10. " myosotis (Draparnaud) San Pablo,Calif. (Smith) x 2
11. " " " Long Island, N.Y. (Jacobson)x 2
12. Pedipes unisculatus Cooper,1866. Palos Verdes 8/36 (Burch)(5mm) x 3
13. Massyla modesta (Carpenter),1865. Puget Sound (T. Kincaid) x 1.3
14. Photo showing "Slim" Connoly, Miss Connoly, T. Burch and half of Dr. Gregg collecting Phytia on Terminal Island as described elsewhere in the Minutes by brushing them off the marsh grass. Drawbridge can be seen in the distance.
15. Photo showing "Slim", Doc Gregg,and T. Burch laborously collecting Pedipes and Truncatella at Palos Verdes just below the swimming pool . While it cannot be seen from the picture we are about 15-20 feet away from the water. From the picture it can be seen, however,that we have excavated a hole nearly waist deep. This is made easier by proceeding at the edge of the bank of rocks thrown up by the waves. In the fore--ground can be seen old seaweed and eel grass. Down a little where it was moist this had quantities of Fartulum.
16. Massyla crawfordiana (Dall)1891. Redondo Beach, 50f (Burch) 34mm x 1 .3
17. Massyla rhyssa (Dall),1919. Redondo Beach 75 f (Burch) x 2.6
18. " " San Vicente 20f. 9mm. (Burch) x 2.6
19. Admete couthouyi (Jay),1839. Puget Sound (T. Kincaid) 10mm x 2.6
20. " " " "
21. Olivella baetica Carpenter,1864. Series of 6 showing variation. Off Redondo Beach, Calif. 25 f. (Burch).
22. Olivella pycna Berry,1935. Morro Rock, San Luis Obispo Co. (Burch)
23,24 Cystiscus subtrigona (Carpenter),1864. S. Coronado Id. 7-14f (Dr. Fred Baker) 2.5mm x 7
25. Cystiscus regularis (Carpenter),1864. Catalina Id. 25f (Burch) 3mm x7
26,27. Cypraeolina pyriformis (Carpenter),1865. Mission Bay (Burch) 2mm x7
28. Cystiscus jewettii(Carpenter),1857. Monterey 20f (Burch) 5mm x 7
29. Mitra idae Melville,1893. Terminal Island,Calif. x 1
30. " montereyi Berry,1920. Monterey 15 f (Burch) x 1.3
31. " " " Redondo Beach 75 f (Burch) x 1.3
32. Spisula dolabriformis Conrad,1867. left valve-- ANSP type #51411
33. " " " right " " "
34. " " left valve, Estero, Todos Santos Bay,Mex. (Burch)
35. " strongi n. sp. left valve Newport Bay (Strong) x 1.1
36. " " " inside of left valve
37. " " " inside of right valve
38. " " " hinge of right valve photodrawing
39. " " " " left " "
40. Spisula dolabriformis Conrad. Hinge of left valve drawn from photograph
41. Mytilus edulis diegensis Coe. Newport Bay,Calif. (Burch) x½


III
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Ant lat tooth
Ant lat tooth
Cardinal teeth
Proximal anterior lateral teeth
distal ant lat tooth
Posterior lat tooth
40.

ADDITIONAL NOTES ON WEST AMERICAN SPISULAS WITH A DESCRIPTION OF A NEW SPECIES

By Thomas A. Burch

Spisula dolabriformis Conrad,1867. Plate III, figs. 32,33,34,40.

This was described in the American Journal of Conchology, vol.3, p.193, and was figured in the same journal, vol.5, pl.2, fig.1 (see Minutes #44, p.15 for reproduction of figures). This figure shows that Conrad used a composite type. In 1894, Dall redescribed and refigured both species figured as *Spisula dolabriformis* by Conrad, Dall named the larger species *Mactra hemphilli* and the smaller *Mactra dolabriformis* (Nautilus, vol.7, p. 137, pl.5, fig.2 and p. 138, pl.5, fig.1 respectively.) (see Minutes #44, p. 16 for copy of figure of *S. dolabriformis*). Dall apparently was unaware of Conrad's figures since he made no reference to them, and had not seen Conrad's types since he stated that he had seen but two specimens of *S. hemphilli*,both of which came from San Diego and both of which presumably are in the U.S. National Museum collection.

Photographs of the smaller of Conrad's two type specimens sent to us by Dr . Jeanne Schwengel, show it to be identical with specimens that we have been calling *Spisula dolabriformis*. See plate III, figs.,32,34, & 40; also Minutes #44, p. 14. None of the specimens that the writer has seen have the ligament separated from the chondrophore by a shelly plate and hence belong to the genus *Spisula* and not to *Mactra*. Since Dall specifically stated in Nautilus, vol.7, p.138, that "*Mactra dolabriformis* is a true *Mactra* with the ligament separated from the cartilage by a shelly plate" and since his figure does not have quite the same shape and proportions as the photograph of Conrad's type or specimens in our collection, it is possible that Dall actually described a *Mactra* but not *Spisula dolabriformis*. This probably could and should be checked at the U.S. National Museum where the specimen figured by Dall is located.

The larger of Conrad's type specimens is apparently no longer in existence. This is just as well since if it instead of the smaller specimen were extant, then what we know as *Spisula hemphilli* would have to be called *S. dolabriformis* , and what we know as *S. dolabriformis* would need another name.

Spisula strongi, new species Plate III, figs. 35 to 39.

Shell triangular, nearly equilateral, anterior end slightly longer; anterior dorsal margin nearly straight and sloping gently down,posterior dorsal margin rounded and sloping abruptly down; ends and ventral margin curved; small chink over site of ligament attachment surrounded by a small escutcheon; epidermis olive yellow, with a slight ridge of epidermis demarcating the posterior umbonal slope where the epidermis is wrinkled from the remainder of the shell where the epidermis is smooth except for incremental lines of growth; pallial sinus not extending as far anterior as cardinal area; right hinge with two and left hinge with one posterior lateral teeth and each hinge with but one small anterior lateral tooth neither of which is divided into proximal and distal portions; cardinal teeth like an inverted V with a posterior projecting spur at the apex. Area of ligament attachment not separated from the chondrophore by a shelly lamina. Length 52 mm., height 24 mm., width 17 mm.

This shell is nearly identical to *S. dolabriformis* but can easily be distinguished by the hinge. *S. dolabriformis* has the anterior lateral teeth divided into both a proximal and a distal portion, (see Minutes #44, p.8 and appendix to this article for classification of lateral teeth) while in *S. strongi* the anterior lateral teeth are very small and are not divided into proximal and distal portions. In addition the right valve of *S. dolabriformis* has two anterior lateral teeth while *S. strongi* has but one. Incidentally what I call the proximal anterior lateral tooth has been referred to by others as an accessory shelly lamina adjacent to the cardinal teeth.

The type specimen was collected from Newport Bay, Calif. by Mr. A.M. Strong. It has been sent to the U.S. National Museum.

KEY TO SPECIES OF SPISULA

Posterior end longer than anterior
. Pallial sinus deep .... *S. catilliformis*
. Pallial sinus shallow .... *S. polynyma alaskana*
Posterior end shorter than anterior
. Right valve with anterior inferior lateral tooth not divided into two distinct teeth,
.. Right valve with four lateral teeth .... *S. hemphilli*
.. Right valve with three lateral teeth .... *S. strongi*
. Right valve with anterior inferior lateral tooth divided into two distinct teeth, the proximal joining or nearly joining the anterior cardinal tooth.(referred to as an accessory shelly lamina adjacent to the cardinal teeth by some authors),
.. Left valve with anterior lateral tooth not divided into two distinct teeth.
... Anterior superior margin of shell definitely convex; hinge plate small in proportion to cardinal teeth; proximal anterior inferior lateral tooth of right valve definitely separated from cardinal teeth... *S. falcata*
... Anterior superior margin of shell nearly straight; hinge plate large in proportion to cardinal teeth ....*S. planulata*
.. Left valve with anterior lateral tooth divided into two distinct teeth; proximal anterior inferior lateral tooth of right valve nearly fused with the anterior cardinal tooth .... *S. dolabriformis*

APPENDIX: Classification of lateral teeth in *Spisula*.

I have tried to base this upon what I believe is a developmental premise as illustrated by our Pacific coast species. In my opinion the hinges of *S. catilliformis*, *S. hemphilli*, and *S. p. alaskana* are the most primitive or at any rate the least differentiated, since these species have but two lateral teeth in the left valve and four in the right valve (2 anterior and 2 posterior). In other species of *Spisula* one or more of these lateral teeth is separated into two more or less distinct teeth(they are not completely separated in *S. falcata* and *S. planulata* but are completely deparated in *S. dolabriformis*). Reference to drawings in Minutes #44, pp.9-14 and plate III, fig.40 should make this clear. Perhaps erroneously I have considered this a sign of differentiation and therefore advancement. Since I always get confused when teeth are numbered, as in Keen and Frizzell's Key to Pelecypod Genera, I have named the teeth according to their actual position with regard to the hinge. While the names may sound confusing, they can easily be figured out with the shell or drawing. Incidentally what I call the proximal anterior lateral tooth is referred to by Dall as an accessory shelly lamina adjacent to the cardinal teeth.

New publication received-
" Revista de la Sociedad Malacologica " Carlos De La Torre", Museo Poey, Universidad De La Habana, vol.2, Diciembre,1944, Num.2.

Each succeding issue of this fine paper of our brother students in Cuba seems to be an improvement. They are very interesting. I am refreshing my Spanish reading them. One short illustrated article is devoted to a subject that I wish could be simply translated and reprinted in our Minutes. It is a guide forthe description of gastropod mollusks with photographs showing the different measurements as well as a complete outline to be followed. This is an idea so well worth copying that I am hoping to have one of our qualified members prepare such a paper for us in English.

In addition to many other interesting articles there is a paper in English " A New Tropical Buccinum from Cuba" by W.J. Clench and C.G. Aguayo. The type came from 288 fathoms but it is interesting to find this genus in tropical waters.

Walter J. Eyerdam, Oceanic Fisheries, Port Vita, Alaska. We were surprised today to receive a censored letter from our member postmarked Kodiak,Alaska. " At last I am on my way to Alaska again to my old job in the herring fishery at Port Vita, Kodiak islands. I expect to be back in the Lake Union Ship Repair yard in October. For three seasons I was barred from going to Alaska to this job which is a key position in an essential Al war industry. This time it came up again and the military commander said no so I sent a direct appeal to our new president. He gave immediate permission to change my job and go to Alaska. After four years in the shipyards this is indeed a welcome change for me and I will be working with old friends. It will be several weeks before the real herring season starts so I probably won't be working more than ten hours per day at first. Anyway there will be some spare time once in awhile to collect shells on the beaches when the tides are low although this locality is not a specially good one and the rocks will later be covered with herring oil. When I was at Port Vita and Thum Bay in 1939 and 40 I made a splendid collection of at least 5,000 sheets of plants including flowering plants, ferns, mosses, lichens and liverworts. This time I also will collect seaweeds and another series of all the flowering plants I can get during spare time. Mt wife came one hour later to see me off on the boat and brought the "Minutes" which had just arrived. I have my west coast shell notes along so I will continue to send my contribution to the monthly report. It won't be as good as the one from home because I don't have access to my collection. I have just completed the enclosed report for you and you will note that some of the northern species that I have are quite rare in collections and some I have given greatly extended ranges. Most of the Buccinidae and other shells from the Bering Sea were sent to Dall by the U.S. Fish Commission and I doubt whether there are many of them to be found outside of the U.S. National Museum except for duplicates distributed by Dall and Bartsch to a few larger institutions. "

Ted Dranga,3462 Main Highway, Miami 33, Fla. " Certainly its time you had a definite minimum contribution for your most interesting Minutes. Heres mine."

Mrs. Harold R. Robertson,136 Buffum St., Buffalo 10, N.Y. " You should have done this long ago- theyare worth a subscription price and I am enclosing.."

Professor J. Harlan Johnson,Colorado School of Mines, Golden, Colo. " I have just had a letter from one of my former students who is stationed in the Marianas. Like many of the other officers stationed there, he has become interested in collecting shells as a pastime and wishes me to recommend a book or books which will aid him in identifying them."

Dr. Bartsch advised us a short time ago that he had a paper in the press to help with just this situation. There really isnt much to recommend at this time. Mr. Webb's new book should be of value.

New publication received-

Johnsonia, Number 17, May 29,1945. Published by the Department of Mollusks Museum of Comparative Zoology, Harvard College, Cambridge, Mass.

" The Genus Murex in the Western Atlantic" by W.J. Clench and I. Perez Farfante. 56 pages, 28 plates.

The authors have made a great contribution in this carefully illustrated work. There are a few changes in well known specific names, but the generic name Murex is retained for all species the divisions taken care of by means of subgenera. This is not only interesting but surprising because the trend with recent authors has been to raise all easily distinguishable subgeneric groups to generic standing. Murex s.s. characterized by the very long siphonal canal is about as different from some of the subgeneric groups involved as anything you could find in your entire shell cabinet. The arrangement of the divisions of the family Muricidae has been a subject of general discussion among conchologists for many years before and since the publication of the proposed new classification of the family by F.C. Baker in 1895. About the only thing they could all agree upon though has been that the arrangement used by Dall and in general use until recently is impossible. Powell,Iredale and many others have been giving generic standing to many of the subgenera used in this paper. The present editor is not going on record here with an opinion. It has always been a good proposition for debate in our club to simply state " Resolved that all clearly distinct subgeneric groups should be raised to generic standing". Those taking the affirmative will open by stating that we are presumed to be using a binomial system,but if we use a generic name, a subgeneric name, perhaps a sectional name as well as a specific name we are getting into trinomials or quadrinomials or worse. Therefore it is simpler to use more genera. The negative is always well represented though with perhaps their loudest complaint that if we establish a multitude of different genera no one will know them.

The editor started out above to announce his pleasure at receiving this fine paper and just strayed from the subject a bit.

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MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA June,1945

The Conchological Club of Southern California met at the usual time and place Sunday, June 3,1945.

The meeting was called to order by the president- George Willett.

No committee reports were given and the fourteen members present proceeded to study the chosen lesson which will be outlined elsewhere in the notes.

Most of the species studied were from waters deep or far away and very unfamiliar to many of us; but beautiful and interesting as they were, they inspired a longing to find them for ourselves.

As closing time for the museum drew nigh, the meeting was duly adjourned.

Effie M. Clark, Secretary.

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Chester W. Melville,20 Hammondswood Road,Chestnut Hill,Mass. " We returned May 1 after a three months stay at Fort Myers Beach. We found the collecting at Sanibel,Marco, and Ft. Myers very poor this winter.."

Mrs. H.P. Walker,Route 2, Box 242,Healdsburg, Calif. " I should greatly appreciate any and all information explaining how to clean and preserve shells so that their coloring may be retained." Inasmuch as your editors collection (much to the annoyance of some friends) consists of shells exactly as they came from the ocean, unfortunately in some cases even retaining a bit of the mud, perhaps some of the members with real beauty collections will write Mrs. Walker.

Rev. William Henry Fluck, Newfane,Vermont. " I no longer live at "Fahe Forest". My address now is simply, Newfane,Vermont." Rev. Fluck in his letter gave some interesting personal data. " I have been a student of shells for 50 years. I have more than 100 bound books on the subject, and hundreds of pamphlets. I have 3,500 species, probably 40,000 shells in 12 large cabinets. I have years and years of the Nautilus, have collected in Nicaragua and many states. I collected with Sterki and lived neighbor to him and knew him better than some who wrote about him. I have known Pilsbry all my life, lived in his city; also Vanatta, until he died. I corresponded with Caesar Ancey years ago, and exchanged with him when I was in Nicaragua..."

Dr. A. Myra Keen, Box 1563, Stanford University, Calif. Dr. Keen was among those who received recent issues of the Minutes in mutilated condition. If we have too much of this it will, of course, become necessary to either roll them or place them in envelopes. Please advise when your paper arrives torn. Dr. Keen suggests " I wonder (this is just a fleeting idea) whether it would be practicable for you to require your " subscribers" to send you in advance a sheaf of, say, 12 self-addressed mailing envelopes." Frankly, I knock them out the easiest way which is flat but anybody who cares to send me the envelopes will get his paper in his envelope and be thanked for them.

Dr. B.R. Bales, 149 West Main St., Circleville, Ohio. " The box of shells arrived safely and I want to thank you for them. Three or more varieties new to the collection, and when a collection gets up past 8650 varieties, the new ones come mighty slowly. It is beginning to look as though our son who is now stationed in Bermuda will get his discharge in two or three months. He will be 42 his next birthday and has been eligible for a discharge for some time but feels now that we have the Nastys licked, he wants to get back home. I was hoping that he could collect some marine shells for me in Bermuda, but he has no way to clean them, so I suggested that he confine his small opportunities to collecting land shells, as he could send them home alive and I could do the cleaning. He wrote that he had found a quart tin can and was going to fill it with various snails. He wrote in the next letter that he had no idea how many snails it took to make a quart, but that he was sticking to his original intention to fill the can. More power to him and I am expecting a well filled tin can almost any time now and am anticipating several long sessions of boiling and squirting snails.

(Reminds the editor of a box of shells he once received from the Island of Crete, mostly Clausilia. Overlooking the rejuvenating effect of the climate of southern California they were opened up and laid out on the table. The next day they were literally all over the place. It is hoped that they were all retreaved and that they died happily in the alcohol.)

Had a letter from Ralph Humes yesterday. He has just returned from several days collecting on the Florida Keys. Says that this is the dryest season ever experienced there and that he was none too successful with Liguus though he took a few L. osmenti.

Dr. Pilsbry writes that he has but a month or two of work on the last volume of " Land Mollusks of North America" and it will be ready for publication. There will be one color plate of Liguus in this volume, and it is a good plate. I have seen it."

W.G. Parris, Boom, Tenn. " ... I hope you continue in the good work. John is still in Brooklyn, N.Y. We are expecting Frank Ray home in June for a few days. Last word we had from him May 13 he was in Czechoslovakia. "

Maxwell Smith, Box 65, Winter Park, Florida. " The May number of your "Minutes" has arrived. It is of particular interest to me. You are doing splendid work and deserve proper financial support."

Frank Lyman, Lantana, Fla. "... but must say your publications are superduper. Certainly appreciate your efforts .."

MINUTES OF THE LONG BEACH SHELL CLUB- June 10,1945

The president, Mr. E.P. Baker, called the meeting to order. Reference was made to the effect that occasional topics in connection with Johnsonia's publication are being prepared and to be obtained for $2.50 for 100 pages andare well illustrated. Two good books, Animals of the Seashore by Guberlet and published by the Metropolitan Press, Portland, Oregon and The Seashore Parade , same author, published by Jaques Cattell Press, Lancaster, Pa. were shown. The latter is colorfully illustrated for younger children. Mr. Ulrich showed beautifully marked carpet shells from Naples mud flats. Since the Cabrillo Beach area is to be taken over by the Navy,we are w onderòng as to the disposition of the museum there, and Mr. Ulrich and Miss Eaton were appointed to inquire and act regardi ng contacting supervisors of the county to relocate this if it is to be disturbed. Mrs. Bormann has offered to begin compiling the shell club collecting data which Mr. Baker has asked the members to contribute. Many suggestions as to the contents were offered. Reference was made to the fact that Boy Scouts have no shell knowledge requirements intheir work outline. In a letter from Miss Zech to Miss Rogers, in appreciation of the fact that her shell contribution has been housed for future shell collectors, she mentioned how she would have benefited by shell exhibits which present day museums offer and hoped that Long Beach might some time have one.

A report of the experiences of Grace Paxon and her mother , Mrs. Ferris, as shell collectors in Florida was read by Mrs. Bormann since they could not be present. Their first collecting was done on the east coast but upon advice of friends they made their first pilgrimage to Sanibel, then in 1924 a days drive a cross the state, but which now takes only three hours for the trip. At the west coast they were taken by ferry to Sanibel and could see another small island, Captiva, which too, has fine specimens but less numerous. The little island 12 miles long and 2 wide, is rather barren,sandy and desolate looking, with but few inhabitants and occasional coconut palms, pines, and palmetto trees. Housing on their trips was always a problem, but well worth the trouble, for the pleasure of finding the many species crawling over the beach alive or buried in three or foot high mounds, was sucha joy. She mentioned finding Melongena corona and specimens of Fasliolaria gigantea unharmed deep in these mounds, Fasciolaria tulipa, Cassis inflata, Cancellaria reticulata , Busycon perversum, Ficus papyratia and many others were among her list but they were dissapointed in never finding Voluta junonia. The pleasured of shells collecting were enhanced by the meeting in 1926 of Mr. Frank Lyman at Omympia Beach, north of Miami where he was then operating a roadside shells for sale stand. In his private collection he showed them beautiful specimens of Spondylus from the gulf voast and Tarpon springs and many other shells from the keys,and Lake Worth. Dr. Pilsbry was first met by Grace's sister at the Philadelphia Museum, but when he was searching for tree and land snails of the Florida Everglades he invited the family to visit him and his daughter in their home at Lantana on the east coast near Lake Worth. She described him as a very short, lith man, with very white hair and a unique sense of humor and an astounding knowledge of shells. Mrs. Paxson had a splendid visit with him last year in Philadelphia where he showed three rooms brimming with countless varieties of shells, material used in work on his book. He had that day received three large slugs from Mass. and some tiny snails from Texas no larger than a pinhead. Mr. Bing Miller, probably next of importance to Dr. Perry on Sanibel, was pleased to have the Paxon family drive across the state to make his acquaintance.

***** The Long Beach Shell Club voted to adjourn during July and August, meeting the second sunday in September in the Childrens Room of the public library in Lincoln Park.

Ruth E. Eaton, Secretary.

Additions and Corrections

Minutes #47,p.10 Dr. W.P. Woodring advises as follows (Per. Comm. May 1945) : " It may be pointed out that Berry described, but did not figure a Pleistocene Microglyphis from Hilltop Quarry as Acteon schencki (Bull. Am. Pal. vol.27, no.101, p.3, 1941). It is presumably a synonym of Acteon breviculus; at least I identify a Microglyphis from localities near Hilltop Quarry as A. breviculus. I think you are justified in giving generic rank to Microglyphis."

Middendorff references- Dr. A. Myra Keen advises as follows (Per. Comm. May,1945): " I find that Dr. Dall cited most of the Middendorff references incompletely. Much of my day today was spent trying to get exact dates of publication. It would be so much simpler if Middendorff had been content to publish his new descriptions just once. I think I have them straight now and have typed out a number of correct (I hope) references on a supplementary page. These are in no order, Iwarn you. Dall got most of the Middendorff dates right if not the references. Most of the pre-published descriptions came out in 1848, according to Sherborn, though another author says 1849. The illustrations are in two monographs, the first usually called the "Beitrage"(1849), the second the "Sibirische Reise"(1851). I defy anybody to find the references in any well-organized library under those titles The Beitrage was published as one of the Memoirs of the St. Petersburg Academy of Science, as I have shown on my sheet of notes, and the "Sibirische Reise" has quite another title. Both books are on my desk now,and I am going to type up an adequate explanation of plates (of which I will send you a carbon) before returning them to the Stanford Library's rare book room. Stanford's copy of the " Beitrage" has the late Czar's own book-plate in it."

" Incidentally, the correct title of the work Dall quotes as "Sibirische Reise" is: " Reise in den Aussersten Norden und Osten Sibiriens", Bd . II, Zoologie, Theil 1; Wirbellose Thiere ".

These references will be used more extensively in the next issue in which we discuss the Buccinidae.

A partial distribution of paratypes of the recently described species, Cardita redondoensis Burch, and Nuculana penderi redondoensis Burch was made to the following: California Academy of Sciences, Natural History Museum of San Diego, Stanford University, British Museum of Natural History, Dr. H.A. Pilsbry, Dr. W.J. Clench, J.R. le B. Tomlin, A.S. Koto, Dr. B.R . Bales, Dr. Jeanne Schwengel, W.J. Eyerdam, A.M. Strong, Morris Caruthers, E.P. Chace, Dr. W.O. Gregg, Maxwell Smith, Paul McGinty, Rev. Paul D. Ford.

Fasciolariidae
Ampullariidae
Buccinidae
Columbellidae

MINUTES OF THE CONCHOLOGICAL CLUB OF SOUTHERN CALIFORNIA
July 1945

These papers are published by a group of interested students for our own pleasure and financed by voluntary contributions of members and friends. It is not our intention to offer subscriptions and guarantee regular periodical publication. However, non members of our club will be placed on our mailing list and receive all papers published for contributions to our fund of $2.50 per year or $1.25 each six months.

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Our next meeting will be held August 5, at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. at 2:30 P.M.
We are now meeting the first sunday of each month.

Please mail all news about shells, shell publications, shell collectors, shell trips, localities etc. to your editor,

John Q. Burch,
4206 Halldale Ave.,
Los Angeles 37, Calif.

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Our readers should understand that conclusions reached in these papers are by no means final. We are merely trying to accumulate enough information to enable us or other students to work to more advantage in the preparation of a final report. In the meantime we are eager to get all information possible. Members and friends are urged to write in their experiences and opinions, and what is even more important advise us when they think we are in error.

****

We still have on hand a few copies of our bound Distributional List, Part I, Pelecypoda for which we are asking $5.00 to our fund.

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New Publication- " A Potential Intermediate Host of Schistosoma mansoni" by Eloise B. Cram, Myrna F. Jones and Willard H. Wright. Science, March 23, 1945, vol. 101, no. 2621, p.302. Recent tests have shown that Tropicorbis havanensis (Pfeiffer) is suitable for the development of the intermediate stages of Schistosoma mansoni. Specimens tested were collected at Baton Rouge, Louisiana. In addition to specimens from various localities in Cuba, there is in the National Museum collection a set of specimens collected from Lake Pontchartrain, Louisiana and another lot from near New Brunfels, Comal County, Texas. Careful collecting will probably extend the known distribution of this mollusk. -- Dr. W.O. Gregg

" Collecting Marine Specimens as a Hobby" is a four page bulletin prepared by the Cabrillo Beach Marine Museum of the Los Angeles City Recreation Department. Requests for the bulletin should be mailed to the department at Room 305 City Hall, Los Angeles. Dr. William L. Lloyd, director of the museum writes us " This bulletin was prepared in response to the demand of the boys going to the Pacific who wanted to know what to collect while there. I wish your " Minutes" had an index. It is beginning to be hard to find what I want when I need it."

" Underwater Tidbit" by Leslie T. White is an interesting article and well illustrated on the west coast Abalone (Haliotis) appearing in Colliers, June 30,1945, p.52.

Mr. W.J. Bower,4 Edgehill Close, Bronxville,8, N.Y. " Dear John: As I wrote you some time ago, I have been assisting a friend in a project to supply the new Nashville Children's Museum with the beginning of a shell collection. In the course of that collecting, my friend, Mrs. Mary J. Coles of Nashville, made a find which seems rare enough to bring to your attention. Dr. Clench of the M.C.Z. and editor of Johnsonia writes me he has never seen any published note on the eggs of Strombus pugilis alatus Gmelin , and suggested that I write such a note. A copy is inclosed and a specimen of the eggs has this day been mailed to you. I hope it will prove of interest.

I think you have done just the right thing in fixing a subscription price on the Minutes. ... Please mail my copies to a new address which I shall use after June 27th."

Note on the egg laying process of Strombus pugilis alatus Gmelin, as observed May 11,1945 in Boca Ciega Bay at the foot of 31st St.,S., St. Petersburg, Pinellas County, Florida.

All the shells were found on a bar of clean white sand, about 150 feet out from high water mark. As the tide ebbed, exposing the bar, the shells began to pop out of the sand, very much like Terebras on an exposed bat. Of the 122 specimens examined there were only 7 laying eggs. These were partly buried in the sand, with the lip of the shell exposed. The eggs emerged from the mollusk imbedded in a continuous string of matter, about a millimeter in diameter. This string piled up into a loose ball in the space between the lip of the shell and the sand. Microscopic examination showed this egg string to be composed of small grains of white sand agglutinated by an albuminous substance. As the egg-string did not pass through the sand the mollusk apparently takes in the sand, and fabricates the egg-string around the eggs as they emerge. The egg-string balls averaged about the size of an English walnut, but one was about twice that bulk.

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Clyde H. Hebert, Ch. Pharm., USN, U.S.S. Griggs (APA 110), c/o Fleet Postoffice, San Francisco, Calif. " I wish to express my appreciation for the copies of the Minutes which I have been receiving since March; and am in agreement with the suggestion regarding an assessment on those interested in receiving further copies. Please accept the enclosed money order to help with expenses.

Have had some luck recently with collecting, taking six or seven different species of cones (C. hebraeus L., C. rattus Hwass,C. striatus L., and other I don't know) from one small locality, although censorship regulations will not permit disclosure of the ship's whereabouts at this time."

University of Hawaii, Library, P.O. Box 18, Honolulu 10, Territory of Hawaii.

We are honored to welcome this fine institution to our mailing list and to send them a file of all of our available back issues.

Dr. Joseph F. Poland, Geologist, U.S. Dept. of the Interior, Geological Survey, 5573 East 2nd St., Long Beach 3, Calif. Miss Edna Cook and Mrs. Effie Clark will be interested to know that Dr. Poland recently wrote in a special request for our Minutes #21 containing the paper listing the fauna of the " Anomia" bed on Vermont Avenue approximately one block south of Sepulveda Blvd.

H. Carroll McGowan, Route 1, Box 173A, Hollister Ave., Santa Barbara, Calif . " Am now living with my father about five miles out of Santa Barbara on Highway 101, a little past city limits, next to Poppy Auto Court. Have all the shells here ..... Am working for Spreitz Transportation Co. driving busses. If up this way sometime would like to see you or any of my collector friends."

Dr. F.M. MacFarland,775 Santa Ynez, Stanford University, Calif. " I am glad to see that you are putting the Minutes on a subscription basis.... Dr. Myra Keen's idea about [illegible]ing you self addressed envelope [illegible] good one ..."

Family FASCIOLARIIDAE

Key to Genera (From the notebook of Mr. A.M. Strong)

Columella plicate
. Outer lip with a tooth-like projection at the base .... Leucozonia
. Outer lip not toothed
.. Anal fasciole distinct
... Canal short,wide,spire short or moderate .... Fasciolaria
... Canal distinct,narrow,spire turrited .... Latirus
.. Anal fasciole absent
... Axial sculpture predominating .... Metzgeria
... Spiral sculpture predominating ....Ptychatractus
Columella smooth .... Fusinus

Genus Leucozonia Gray (Proc. Zool. Soc. London, pt. 15, p.136; type by original designation, Murex nassa Gmelin (Turbinella cingulifera Lamarck), Recent, West Indies. (fido Woodring,1928)

This genus is not represented in our fauna north of San Diego but the following species is described from the southern fauna.

Leucozonia cingulata (Lamarck),1822. Gulf of California to Ecuador. " Shell ovate, white with brown spiral ridges" (Strong). Reeve,Monoceros, pl.3, fig.11; Tryon, vol.3, p.96.

Genus Fasciolaria Lamarck,1799. Type (by monotypy), Murex tulipa L.

" Shell reaching a gigantic size, stout, fusiform. Nucleus forming a blunt apex, consisting of between one and two broad smooth whorls. Aperture long and very wide, contracted at base to form a short,relatively narrow,oblique canal, flaring and slightly emarginate at base.Siphonal fasciole low,broad. Columella bearing immediately above beginning of canal three low oblique folds, decreasing in strength upward. Parietal wall covered with glaze of callus. Interior of inner lip finely lirate. Anal fasciole narrow,depressed. Sculpture consisting of spiral cords and grooves, with or without axial nodes or ribs on the shoulder." (Woodring,1928)

This genus is not represented in our fauna north of San Diego, but the following key and list of species from the southern fauna will be of interest. It is taken from Mr. A.M. Strong's notebook.

Key to Species of Fasciolaria

Shell fusiform, with a moderate spire
. Aperture orange, outer lip with raised red spiral lines
   6 to 9 inches. Gulf of Calif. to Peru .... princeps
      Reeve, pl.1, fig.3; Tryon, vol.3, p.75
Shell pyriform, with a short spire
. Epidermis olive colored, aperture salmon tinted
   4 to 5 inches. West Mexico to Panama .... salmo
   Reeve, pl.3, fig.7; Tryon, vol.3, p.78
. Epidermis brown with black granules, aperture orange
   5 to 7 inches. West Mexico to Panama .... granosa
      Reeve, pl.3, fig.6.

Fasciolaria princeps Sowerby,1825. Magdalena Bay to Peru
Fasciolaria granosa Broderip,1832. Gulf of California to Panama.
Fasciolaria salmo Wood,1820. West Mexico to Panama.

Genus Latirus Montfort,1810. Type (by original designation)- Latirus auranriacus Montfort (- Murex filosus Lamarck - Murex gibbulus Gmelin) Recent, Australia. (fide Woodring,1928).

" Shell turrited, fusiform, umbilicated; spire produced, whorls nodulous; aperture oval-oblong; outer lip thin, crenulated; columella straight, with two or three small oblique plaits in front." (H. & A. Adams).

It is our opinion at this time that the genus Latirus is not represented in our fauna north of San Diego, Calif. However, it may be well to mention here that the species lugubris (C.B. Adams) described from Panama figured and described by Thomas A. Burch in Nautilus 54:46, pl.2, figs.5,6,7 as Cantharus, was listed by Pilsbryand Lowe as Latirus. Maxwell Smith followed in Panamic Marine Shells. Dr. Jeanne S. Schwengel published a paper in Nautilus 56:77,78 placing this species in the genus Drupa. Drupa lugubris (C.B. Adams) has been dredged in numbers off Redondo Beach and will be discussed under that chapter.

The following key and list of species from the southern fauna will be of interest. It is from the notebook of Mr. A.M. Strong.

Key to species of Latirus
Axial ribs tuberculate at the shoulder of the whorls
. Spiral ridges narrow, close-set, sharp on spire and base
Brown streaked, ridges whitish
2 to 2.5 inches. Panama .... candelebrum
Reeve, Turbinella, pl.2, fig.8; Tryon, vol.3, p.88
. Spiral ridges rounded, numerous, strongly tuberculate
Whitish, tubercles bluish
Central America to Ecuador .... tuberculosus
Reeve, Turbinella, pl.8, fig.42
. A few strong spiral ridges with spiral striae between
.. Four spiral ridges below the shoulder of body whorl on base
White, stained and spotted with rusty brown
2 to 3 inches. Gulf of Calif. to Ecuador .... ceratus
Reeve, Turbinella, pl.7, fig.37; Tryon, vol.3, p. 88
.. Six spiral ridges below the shoulder of the body whorl on base
Whitish, epidermis blackish Panama. .... rudis
Reeve, Turbinella, pl.10, fig. 51.
Axial ribs not tuberculate
. Spiral ridges on canal only
Reddish orange, epidermis bright chestnut
2 to 2.5 inches. Panama................................ castaneus
Reeve, Turbinella, pl. fig.26; Tryon, vol.3, p.91
. Spiral ridges over the entire surface
.. Axial ribs about 15
Orange brown, ribs darker
2.5 inches. Galapagos .... varicosus
Reeve, Turbinella, pl.2, fig.6; Tryon, Man. Conch. vol.3, p.92.
.. Axial ribs about 10
... Spiral ridges rather broad, close-set
Reddish-yellow, ridges sometimes darker
1.85 inches. Acapulco to Panama .... concentricus
Reeve, Turbinella, pl.1, fig.2 & 44; Tryon, vol.3, p.90
... Spiral ridges irregular, obtuse
Reddish-brown
Panama .... tumens
Tryon, vol.3, p. 91.

List of Species of Latirus
Latirus ceratus (Wood),1829. Gulf of California to Ecuador.
Latirus concentricus (Reeve),1847. Acapulco to Columbia
Latirus tuberculatus (Broderip),1833. Central America to Ecuador.
Latirus rudis (Reeve),1847. Panama.
Latirus castaneus (Reeve) (Gray), 1839. Acapulco to Panama
Latirus candelebrum Reeve Panama
Latirus tumens (Carpenter),1856. Panama
Latirus varicosus (Reeve),1847 Galapagos.

Genus Metzgeria Norman,1879. Type (by monotypy), Meyeria alba Jeffreys
" Shell elongate fusiform, longitudinally obtusely plicate; spire produced; canal exserted; columella obscurely plicate. Operculum irregularly ovate; apex obtuse; nucleus inconspicuous. " (Tryon, Structural and Systematic Conchology).

Metzgeria californica Dall,1903. Off Avalon, Catalina Island,California.
Collecting data: Catalina Island in 50 fms. (G. Willett); Catalina Island (H.N. Lowe).

Genus Ptychatractus Stimpson,1865. Type, P. ligatus Mighels & Adams .
" Shell fusiform, spirally striated; aperture with a moderate canal; columella plicated as in Fasciolaria.
The shell of this genus unites the form of a Sipho with the folds of a Fasciolaria; its small size, color, and northern habitat will distinguish it from the latter, even without taking into account the very diverse dentition; yet without the latter difference it would scarcely have been advisable to have separated the single species upon which the genus was founded from Fasciolaria. (Tryon S. & S. Conch.) '

Ptychatractus occidentalis Stearns,1873. Bering Sea, Bering Island, and eastward to the Shumagin Islands, Alaska. Type locality, near Attou Island, Aleutian group, Bering Sea and Nagai, Shumagins.
Dr. A. Myra Keen advises " Stearns description was not actually published until 1873 (Proc. Calif. Acad. Sci. vol.5, p.79) the 1871 issue having the status of advance proof sheets."

Ptychatractus californicus Dall,1908. Monterey Bay and near San Diego, Calif. in 822 fathoms. Type locality, off San Diego in 822 fms.
" Numerous flattish spiral threads and about 15 axial ribs. White, with a straw colored epidermis. 11 x 5.5 mm" (A.M. Strong).

Genus Fusinus Rafinesque,1815. Type (by monotypy, Lamarck,1799,- first species assigned to the genus, which was originally described without species), Murex colus Linnaeus. New name for Fusus Lamarck , not Fusus Helbling.
" Shell large, slender, spindle shaped, with a long, nearly straight open anterior canal; aperture ovate, outer lip lirate within, parietal wall with callus deposit; sculpture of spiral threads or cords, usually prominent, and of low axial folds or ribs."

The following key and list of species covers the entire coast. It is taken from the notebook of Mr. A.M. Strong. We will then take up a more detailed discussion of the species from San Diego,Calif. northward.

Genus *Fusinus*

Canal long, narrow, tapering
. Axial ribs becoming obsolete on the body whorl
.. Axial ribs of upper whorls nodulated by spiral cords
... Whorls angulated or carinated
150 x 60 mm. Cerros Island to Panama .... *dupetithouarsii*
Reeve, pl. 2, fig.9; Tryon, vol. 3, p.58.
... Whorls rounded
110 x 40 mm Panama .... *sulcatus*
Tryon, Man. Conch. v.3, p.138; Nautilus, v.29, p.54.
.. Axial ribs of upper whorls undulated by spiral cords
... Axial ribs about 10
135 x 38 mm. Oregon to San Diego .... *barbarensis*
Oldroyd, vol.2, pt.1, p.177; Arnold, pl.4, fig.15.
... Axial ribs about 13
66 x 18 mm. Gulf of California .... *colpoicus*
Nautilus, vol.29, p.54
. Axial ribs extending to the periphery of the body whorl
.. Axial ribs spined at the shoulder of the body whorl
22 x 10 mm. Galapagos .... *centrifugus*
Nautilus, vol. 29, p.56
.. Axial ribs noduled at the shoulder of body whorl
... Shoulder of whorls distinctly angulated
50 x 19 mm. Santa Monica to San Diego............. *arnoldi*
equals *traski*, *rugosus*- Oldroyd, vol.2, pt.1,p.176; p.66,pl.3,f.4.
... Shoulder of whorls only slightly angulated
.... Body whorl with 4 or 5 major spiral cords
40 x 15 mm Gulf of California .... *ambustus*
Tryon, v.3, p.59; Carp. Maz. Cat. no.640 as F. *tumens*.
.... Body whorl with about 12 spiral cords
34 x 14 mm. British Columbia to Lower Calif. ..... *monksae*
equals *robustus* Oldroyd, vol.2, pt.1, p. 177
.... Body whorl with many fine spiral threads
75 x 26 mm. Panama Bay .... *panamensis*
Bull. Mus. Comp. Zool., vol.43, p.301.
.. Axial ribs reduced to lines of growth
21 x 8.5 mm. Off Ecuador in 1573 fms. .... *fragillissimus*
Bull. Mus. Comp. Zool. vol.43, p.301
Canal moderate or short, open
. Axial ribs extending to periphery of body whorl
.. Body whorl with about 22 spiral cords
60 x mm. Monterey to San Diego .... *kobelti*
.. Body whorl with from 10 to 15 spiral cords
... Whorls distinctly angulated
20 x 10 mm Gulf of California to Panama ...., *taylorianus*
equals *cinergons* Reeve, fig.85; Tryon, vol.3, p.60
... Whorls not distinctly angulated
.... Axial ribs faint
11 x 5 mm. San Pedro .... *diminutus*
.... Axial ribs distinct
80 x mm. Peruand Chile .... *alternatus*
plus *fontainei* Tryon, vol.3, p. 137
.. Body whorl with 3 or 4 major spiral cords
20 x 10 mm. Monterey to Gulf of California .... *luteopictus*
Oldroyd, vol.2, pt.1, p. 179.

.. Body whorl with 2 peripheral major spiral cords
11 x 5 mm. Panama .... portious
Nautilus, vol. 29, p.56

. Axial ribs on upper whorls only
50 x 24 mm. Mendocino County, California .... harfordii
Oldroyd, vol.2, pt.1, p.180

. Axial ribs on body whorl only
17 x 8 mm. Gulf of California .... orcutti
Nautilus ,vol.29, p.57

List of Species of Fusinus.

Fusinus luteopictus Dall,1877. San Francisco Bay to Gulf of California
Fusinus monksae Dall,1915. British Columbia to Lower California
Fusinus arnoldi Cossmann,1903 (Traski Dall) Sta. Monica to Cerros Island
Fusinus barbarensis Trask,1855. Oregon to San Diego.
Fusinus kobelti Dall,1877. Monterey to Catalina.
Fusinus cinereus Reeve. Gulf of California.
  var. coronadoensis Lowe,1935. Gulf of California
  var. sororaensis Lowe,1935. Gulf of California.
Fusinus dupetithouarsii Kiener,1840. Cerros Island to Panama.
Fusinus ambustus Gould. Gulf of California
Fusinus colpoicus Dall,1915. Gulf of California.
Fusinus orcutti Dall,1915. Gulf of California.
Fusinus hertleini Lowe,1935. Gulf of California.
  var. bruneocincta Lowe,1935.
  var. albescens Lowe,1935
Fusinus fredbakeri Lowe,1935. Gulf of California.
Fusinus felipensis Lowe,1935. Gulf of California
Fusinus sulcatus Lamarck. Panama.
Fusinus panamensis Dall,1908. Panama.
Fusinus centrifugus Dall,1915. Galapagos
Fusinus fragillissimus Dall,1908. Ecuador.
Fusinus fontainei d'Orbigny. Peru and Chile.

There are few groups involving a greater degree of confusion than the west coast species of the genus Fusinus. Without a doubt there will be additional species described and the vague conclusions reached in this paper must be materially altered when more information is available.

Dall placed the four most common of our species in Section Heilprinia Grabau,1904. Grant and Gale,1931, place the same species under Section Gracilipurpura Jousseaume,1880.

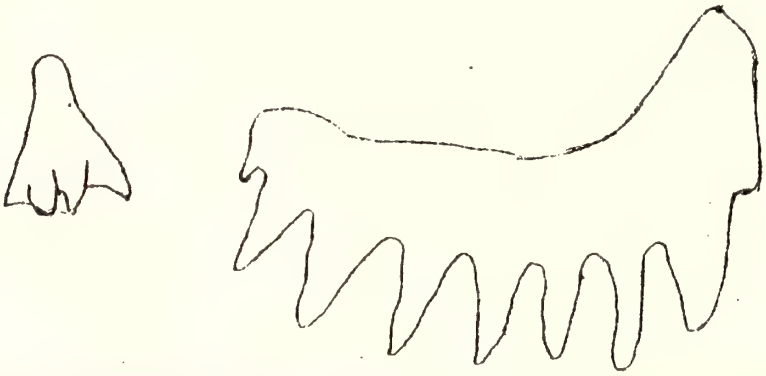
" Grant and Gale give a key to the species, but the fact that the same species appear in many southern California collections bearing a variety of names is proof of the need for a clearer key and explanation.

Fusinus arnoldi (Cossmann),1903. Rev. Paleozool. vol.7, p. 215,1903. New name for F. rugosus Trask, not of Lamarck. Also named F. traski by Dall in 1915. The confusion of names is clearly stated by Dr. Hanna " Rectificat--ions of Nomenclature", Calif. Acad. of Sci., vol.13, no.10, p.166. F. arnoldi is the correct name.

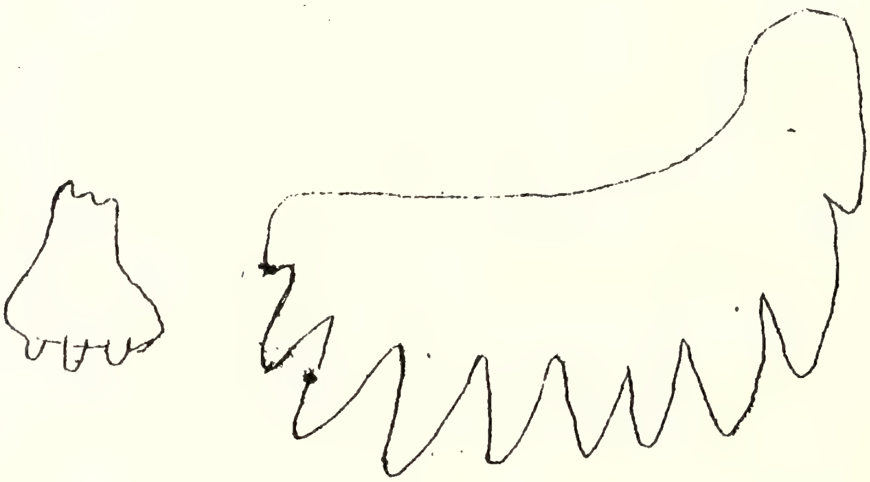
However, after we settle the name there still remains the question of just what is arnoldi. Is it a fossil species and not known in the Recent fauna? The shell we have been labelling Fusinus arnoldi is purple in color when fresh and has the prominent revolving brown lines mentioned by Grant and Gale. They make it a subspecies of F. barbarensis and the species we have been labelling F.barbarensis might bear out such a conclusion on form alone. However, our barbarensis coming from much deeper water than our arnoldi do not have the purple color and in addition seem to have a longer and more curved canal. Further proof that the two are distinct is the fact that the radula differs greatly. Drawings of the radulae will follow. They were prepared by Thomas A. Burch. The only real question involved then is whether or not the shells we have been labelling barbarensis are really that species or perhaps an undescribed species. We will figure this shell on our next plate. Mr. George Willett comments as follows " I think Recent shells called arnoldi are young barbarensis and that true arnoldi is known only as a fossil".

The type locality is San Pedro, Calif.

Collecting data: A very common shell in gravel from around 25 fms. off Redondo Beach, and in the somewhat shallower gravel beds around 15 fms. off Santa Monica, Calif. and also off El Segundo, Calif. in perhaps as deep as 35 fms.; mouth of Tia Juana River (Frank Stephens); Catalina Island and San Pedro (H.N. Lowe); Cedros Island, Lower Calif. (Crocker); Redondo Beach in box trap at 650 ft. (Tremper); Newport in 40 fms. (Tremper); San Diego in 30 fms. (Gripp); Monterey in 15 fms. (Berry),



Fusinus barbarensis (Trask),1855
off Redondo Beach, Calif. 75 fathoms (Burch).



Fusinus arnoldi (Cossmann),1903.
off Redondo Beach,Calif. 25 fms. gravel (Burch).

Fusinus barbarensis (Trask),1855 Hecota Bank, Oregon to San Diego,Calif. Type locality, Santa Barbara, Calif. fossil.

Collecting data: Dredged on rocky bottom in 50 to 75 fms. off Redondo Beach, Calif. (Burch); San Pedro and Newport from fishermen's nets (H.N. Lowe collection); Redondo Beach (Cass); Pt. Loma in 50 fms. (Dr. Fred Baker

Fusinus kobelti (Dall),1877. Monterey to Catalina Island (Dall). Type locality not givenwe are advised by Dr. Keen although Oldroyd states it is Monterey.

This is a heavier shell with a much shorter anterior canal than the two species mentioned above. The difficulty here is to distinguish between kobelti and monksae. Grant and Gale,1931, p.640 make monksae a subspecies of kobelti stating that it has a shorter anterior canal and weaker axial sculpture than kobelti. Mr. George Willett separates them as follows:

Varices 8; thicker ..... monksae
" 9; thinner ...... kobelti

Mr. Willett's system seems to fit our custom of identification with more success than any of the others. In any event the species we have been labelling monksae (the predominant form off Monterey or from Cayucos north to Montery in our experience) is thicker than the shells we have been calling kobelti dredged off Catalina Island.

Collecting data: Off Avalon, Catalina Island in 35 fms. (Burch); Catalina Island in 30 fms. (H.N. Lowe); off Catalina Island (Hemphill) (Baker) (Chaney); San Diego in kelp roots (J.M. Cooke).

Fusinus monksae Dall,1915. Banks Island, British Columbia to Pequena Bay, Lower Calif. (Dall). Type locality, San Pedro, Calif. fossil, 80-100 ft. above sea level. (on advice of Dr. A.M. Keen).

Collecting data: An abundant species off Monterey on the shale in about 20 fms., also from Cayucos, San Luis Obispo Co., Calif. (Burch); Redondo Beach in 100 fms. also from box trap at 650 ft. (Tremper); Del Monte,Calif (Mrs. Oldroyd).

Dr. Dall placed the species luteopictus and diminutus under Fusinus s.s. Grant and Gale placed them under Harfordia Dall . Both luteopictus and harfordii are littoral species and both have short canals but the resemblance ends there in my opinion.(J. Burch). However, neither seem to be typical Fusinus and the consensus of opinion seems to be to follow Grant and Gale on this.

Subgenus Harfordia Dall,1921. Type (by monotypy), Fusinus harfordii (Stearns).

" Shell Buccinoid in shape but with the anterior canal produced; shell shorter than in typical Fusinus, with much shorter anterior canal."

Fusinus luteopictus Dall,1877. Monterey to Gulf of California (Dall). Type locality not given we are advised by Dr. A.M. Keen although Oldroyd gives it as Monterey.

Collecting data: Dredged in 10 to 20 fms. off Monterey on the shale, off Santa Monica in 10 fms., and collected in great numbers littoral at low tide at Malaga Cove, L.A. Co. in the rocky rubble, Point Firmin and Pt. Vicente in similar habitat, common on the San Pedro breakwater. The San Pedro shells seem to be somewhat different from the others although obviously the species (Burch); Redondo (Gripp); San Pedro (Lowe); San Pedro (Tremper); San Geronimo Island, Lower Calif. (Lowe); Monterey,Calif. (Lowe).

Fusinus diminutus Dall,1915. We are dropping this species from the list. Herbert N. Lowe in Nautilus 45:51,1931 published an article which definitely settled the matter of roperi . It is to be regretted that he did not at the same time examine the type specimen of diminutus about which there is a general idea that it is something of the same kind of thing. Mr. A.M. Strong writes (Per, Comm.) " It is stated in the description that this species had been received from San Pedro Bay from several collectors. No one seems to know who those several collectors could have been as no one here knew anything about it. Dr. Tremper hunted hard around San Pedro looking for the species. He had one specimen that seemed to fit Dall's description and figure but this was evidently a young and somewhat unusual specimen of Tritonalia poulsoni. Unless some one can come up with a valid specimen the name had better be dropped." However, Miss Viola Bristol, of the San Diego Museum advises that they have a specimen from Newport,Calif. labelled diminutus by Tremper and states " Our specimen is 3/8 inch high and looks to me like a young kobelti." Of course, it is still possible that this is a good species and it is to be hoped that some one will examine the type and settle the mystery.

And while on the subject of this kind of mystery we may as well dispose of Subgenus Roperia Dall,1898 and the species roperi Dall,1898. The Lowe reference given above in the Nautilus settled this matter. Lowe had the types examined by Wm. B. Marshall, Dr. Ralph B. Stewart,and Dr. W.P. Woodring and the unanimous verdict was that they are young Tritonalia poulsoni. Grant and Gale stated that it was a young Kelletia kelletii and Mr. A.M. Strong advises that Dr. Dall identified one of his shells as roperi that is definitely a young Kelletia. Since roperi is a Tritonalia, perhaps diminutus is the Kelletia. In any event Roperia and roperi are out.

Fusinus harfordii (Stearns),1871. Coast of Mendocino County, Calif. Type locality, near Big Spanish Flat, coast of Mendocino Co.

The only specimens of this species in local collections are a set in the E.P. Chace collection and a specimen in the Willett collection. Mr. A.M. Strong writes of it (Per. Comm. June,1945) " Fusinus harfordii Stearns was only known for many years by the type from Mendocino County, California. Later a number of specimens from the same general locality were found. The species is very similar in shell characters to some of the fossil species of Searlesia, a genus with but few living species but a large number of fossil species, all from other parts of the world. The animal is different from that of Searlesia dira , the only living species from the west coast and appears more like some of the Fusinus. More study will be required before it can be definitely stated in which genus it belongs."

Mr. and Mrs. E.P. Chace who collected them in Mendocino county call attention to the fact that harfordii and luteopictus both have the same colored animal, a flaming orange. They are of the opinion that the two species are properly placed in Fusinus and should also be placed in the same subgenus. They submit some comparative dimensions as follows:

	Harfordii	luteopictus	kobelti	S. dira
Height	46	26	33½	43
Diameter	22	9.6	15½	19
Body whorl inc. canal	25	13	20	20
Body whorl	20	10	11½	15
Canal	5	3	8½	5

Subgenus Aptyxis Troschel,1868.

Fusinus taylorianus Reeve,1840. Cape San Lucas to Panama. This species is not of our fauna although erroneously reported from San Pedro. It is of the southern fauna.

Family NEPTUNEIDAE

Genus *Kelletia* Fischer, 1884, ex Bayle MS. Type (by monotypy), *Kelletia kelletii* (Forbes), southern California; Recent. We are advised by Dr. A. Myra Keen " Both the generic and specific names were originally written with a single "t". Dr. Dall in Bull. 112, Oldroyd etc. spelled it Kellettia.

" Shell of medium size or large, heavy, spire and aperture of about equal length; sculpture consisting of spiral striations or riblets and prominent nodosities on the shoulder of the whorls; aperture ovate, with a moderate anterior canal; outer lip not thickened, with lirations within; inner lip with a sharply delimited callus deposit, smooth; columella long somewhat sinuous, tapering toward the end; siphonal fasciole large, with an umbilical chinck or notch between it and the end of the columella; operculum with an apical nucleus; epidermis absent or a mere film. The type species attains a length of 145 mm. and a breadth of 75 mm." (from Grant and Gale, p.642).

Kelletia kelletii (Forbes), 1850. Santa Barbara, Calif. to San Quintin Bay, Mexico. Also Japan. (Dall). Type locality, California.

Collecting data: The most abundant large mollusk between 10 and 35 fms off Santa Monica, Redondo Beach, Newport, Dana Point, Ensenada, Mex. in our experience. They are scavengers and will quickly fill all traps put out for lobsters, crabs, and in our experience our traps for other mollusks. Sold on the Redondo Beach pier for food and eaten by some of the foreign fishermen. (Burch); Todos Santos Bay (Orcutt); Scammons Lagoon, L.C. (Moorshead); Magdalena Bay (Cass); Coronado Islands, Mex. (Frank Stephens); San Diego in 12 fms. (Hemphill) (also Fred Baker); La Playa, Pt. Loma under fish cannery pier (Bristol); San Pedro (H.N. Lowe).

Genus *Macron* H. & A. Adams, 1853. Type (by subsequent designation, Cossmann, 1901) *Macron kelletii* (A. Adams).

" Shell ovate, heavy; strongly spirally sculptured or smooth; whorls moderately ventricose, body whorl much larger than penultimate whorl; aperture ovate, outer lip with a tooth like projection anteriorly, inner lip gently concave; anterior canal short, notched; epidermis strong, brownish or chestnut; operculum horny, with apical nucleus. Length 10 to 100 mm."

Macron lividus (A. Adams), 1855. Farallone Islands to Point Abreojos, L.C. (Jordan). There was an error in the given type locality.

Collecting data: Our experience has been to find this species rare on Terminal Island and increasing in abundance from there southward to Todos Santos Bay, L.C. A very common species under stones at low tide. (Burch); Scammons Lagoon and San Martin Island (Dr. Fred Baker); Scammons Lagoon (Huey); Pt. Abreojos, L.C. (Hemphill); San Blas, Mex. and Cape Colnett, L.C. in mussel beds (H.N. Lowe); Cedros Island (Lowe); Pt. Loma and Newport Bay (Lowe); La Jolla (Bristol and Kate Stephens).

Macron aethiops kelletii (A. Adams), 1855. Gulf of California. It is clear that this species is not of our fauna although reported from Catalina Island supposedly in error.

Other species from this coast south of San Diego are:

Macron aethiops (Reeve), 1847	San Quintin Bay, L.C. to Gulf of California.
Macron orcutti Dall, 1918.	Magdalena Bay, L.C.

Genus Cantharus Roeding,1798. Type (by subsequent designation,Suter, 1913), Cantharus globularis Roeding = Buccinum tranquebaricum Gmelin.

This genus is not reported from our Recent fauna but is abundant in many of our fossil deposits. Thomas A. Burch figured the species lugubris C.B. Adams as Cantharus in the Nautilus 54:46 but this species will be placed under the genus Drupa.

The following list of species of the southern fauna from the notebook of Mr. A.M. Strong may be of interest.

Cantharus elegans (Gray),1833. Gulf of California to Peru.
Cantharus gemmatus (Reeve),1846. Gulf of California to Peru.
Cantharus sanguinolenta (Duclos),1833 Gulf of California to Peru
Cantharus ringens (Reeve),1846. Gulf of California to Ecuador
Cantharus exanthematus Dall,1919. Lower California
Cantharus aequiliratus Carpenter,1857. Mazatlan.
Cantharus vibex (Broderip),1832. Magdalena Bay to Ecuador
Cantharus cinis Reeve,1846. Panama and Galapagos
Cantharus undosus Lamarck Ecuador Atlantic ?
Cantharus biliratum (Reeve),1846. Galapagos
Cantharus procerum Sowerby,1832 Panama
Cantharus janelli Kiener,1835. Peru
Cantharus bolivianus E. and S.,1852 Peru and Chile
Cantharus inca d'Orbigny,1841. Peru and Chile
Cantharus pagoda Reeve. Panama.

Genus Triumphis Gray,1857.

This genus is not represented in our fauna but the following species are described from the south on this coast.

Triumphis distortus (Gray),1856. Puntarenas to Ecuador
Triumphis subrostratus (Gray) Acapulco to West Columbia

Genus Pyrolofusus Morch,1869. Type, Fusus deformis Reeve(fide Dall)

We are advised by Dr. A. Myra Keen (Per. Comm. June,1945) "According to the only nomenclator I have at hand, the original spelling was Pyrolofusus, and Pyrulofusus was a misprinted citation of it later. Dall in 1916 correctly spelled it but later adopted the other form. I have not seen the original but suspect there is no ground for emendation; there would be none unless Morch definitely said he named it for its analogy with Pyrula."

" Shell large, relatively thin, with a very short spire and large body whorl, usually sinistral but with rare dextral individuals; nucleus very large, smooth, flat-topped, infolded with an apical dimple,subsequently spirally sculptured, with obscure axial folds; periostracum thin, dehiscent; aperture simple, the outer lip expanded and thickened, the body and pillar enameled, often brightly colored; the canal very short, shallow and wide, hardly incurved, and with no evident siphonal fasciole; operculum much smaller than the aperture, rounded-quadrate with apical nucleus: radula, chrysodomoid but rather irregular, the rhachidian tooth in the typical species tricuspid; the laterals with two large terminal cusps, the median cusp of the central tooth variable." (Dall).

Pyrolofusus deformis(Reeve)1847. Arctic Ocean and south to the Shumagin Islands, Alaska. Circumboreal. (Dall). Type locality, Spitzbergen.
Pyrolofusus harpa (Morch),1858. Pribilof Islands to the Aleutians and eastward to Kodiak Island, Alaska. (Dall). Type locality, Sitka,Alaska.
Collecting data: Sitka, Alaska, type locality (W.J. Eyerdam).
Pyrolofusus harpa dexius Dall,1907. Petrel Bank, Bering Sea in 54 fms.

Genus Volutopsius Morch,1857. Type (fide Dall,1918), Volutopsius largillierti (Petit de la Saussaye), described as Fusus.

" Shell resembling that of Neptunea, but with a large body whorl, a more ample aperture, a short, hardly differentiated anterior canal, and a short blunt, few-whorled spire."

Volutopsius fragilis Dall,1891. Bering Sea, 15 to 121 fathoms. to Dutch Harbor, Aleutian Islands.

Collecting data: Dutch Harbor, Aleutian Islands on rocks,1932 (W.J. Eyerdam).

Volutopsius melonis Dall,1891. Bering Sea, 227 fathoms.

Volutopsius behringi (Middendorff),1848. Arctic Ocean to Pribilof Islands, 17 to 50 fathoms (Dall). Type locality, Bering Sea.

Dr. A.M. Keen advises " Middendorff spelled behringi with an "h" consistently." Correct reference is " Beitrage", p. 476. Tritonium behringii Middendorff,1848. Bull. Acad. Imp. Sci. de St. Petersburg, Phys. Math. Cl. vol.7, no.16, p.243; figured in " Beitrage" ref. above), p. 147, pl.3, figs 5-6.

Collecting data: Kodiak Island, Alaska (G. Willett)

Volutopsius behringi kobelti Dall,1902. North end of Nunivak Island, Bering Sea, and at the Pribilof Islands (Dall). Type locality,Pribilof Islands.

Volutopsius stefanssoni Dall,1919. Arctic Ocean to Pribilof Islands (Dall). Type locality, Point Barrow, Alaska.

Volutopsius rotundus Dall,1919. Kodiak Island to Cook's Inlet (Dall). Type locality, Kodiak Island.

Volutopsius middendorffii Dall,1891. Bering Sea, 57 to 225 fathoms.

Volutopsius simplex Dall,1907. Off Bering Island, Bering Sea, in 72 fms.

Volutopsius attenuatus Dall,1874. Arctic Ocean south to the Pribilof Islands and Bristol Bay (Dall). Type locality, Cook's Inlet, Alaska.

Volutopsius crophonius Dall,1902. Bering Sea, in 81 fathoms, south of the Pribilof Islands.

Volutopsius filosus Dall,1919. From the Pribilof to the Aleutian Islands, Bering Sea. (Dall).

Volutopsius callorhinus Dall,1877. Pribilof Islands, Bering Sea.

Volutopsius callorhinus stejnegeri Dall,1884. Bering Sea.

Volutopsius castaneus (Morch),1858. Pribilof, Aleutian, and Kodiak Islands, Alaska. Type locality, Sitka, Alaska.

Collecting data: Umnak and Kodiak Islands, Alaska (G. Willett); Point Barrow, Alaska (Brower); Unalaska, Amlia, and Atka islands, Aleutian Islands, on rocks below lowest tide mark, 1932 (W.J. Eyerdam).

Volutopsius regularis Dall,1873. Pribilof, Aleutian, and Sannakh Islands, Alaska (Dall). Type locality, Unalaska.

Genus Jumala Friele,1882. Type (fide Dall) J. turtoni (Bean).

Dr. A. Myra Keen advises (Per . Comm. June,1945) " As Grant and Gale point out, Dall's case for Beringius is weak; in fact, it is in the same class as (1) above. Jumala Friele,1882 would seem to have priority over Beringius Dall,1886 , the first date of actual publication. "

Grant and Gale,1931, p.653 state " Beringius Dall was supposed to have been established in 1879, that name having been used in the explanation of a plate of which Dall had fifty proof copies distributed to conchologists, but its status is questionable as of that date. The type is conchologically similar to the N. lirata group."

" Central plate small, quadrangular, unarmed, laterals hooked, with two small teeth on the inner margin" (Tryon S. & S. Conch.)

Jumala crebricostata (Dall),1877. Plovor Bay, tho Aleutian Islands, and eastward to the Shumagin Islands, Alaska.(Dall). Type locality, Unalaska in 100 fathoms.

Collecting data: Izhut Bay, Afognak Island,1922; Sitkalidak Island, 1931; (W.J. Eyerdam) *** Extension of range eastward from Shumagin Ids. about 200 miles.

Jumala crebricostata undata (Dall),1919. Unalaska, Alaska, south and east to British Columbia in 238 fathoms (Dall). Type locality, Cygnet Inlet, Boca de Quadra, Alaska in 160 fathoms.

Collecting data: Unalaska, Aleutian Islahds, dredged ,1932 (Eyerdam).

Jumala kennicottii (Dall),1907. Aleutian Islands to Cook's Inlet, Alaska. Type locality, Captain's Harbor, Unalaska.

Collecting data: Petersburg, Alaska (G. Willett); Izhut Bay,Afognak Island,1922; Chichagoff Island,1934; Sitkalidak Island,1931 (Eyerdam).

Jumala kennicottii incisa (Dall),1907. Petrel Bank, Bering Sea in 54 fms. to Illulliuk Bay, Unalaska Island (Eyerdam).

Collecting data: Illulliuk Bay, Unalaska Island, 1932 (W.J. Eyerdam).

Jumala stimpsoni (Gould),1860. Point Barrow to the Pribilof Islands, Alaska. Type locality, Arkancheche Island, Bering Straits.

Collecting data: Icy Cape, Arctic coast of Alaska (W.J. Eyerdam); Point Barrow, Alaska (Brower);

Jumala malleata (Dall),1884. Arctic Ocean and northern Bering Sea (Dall) Type locality, Point Barrow, Arctic.

Jumala frielei (Dall),1894. Pribilof Islands, Bering Sea, 66 fathoms.

Jumala aleutica (Dall),1894. Amukhta Pass, Aleutian Islands, 248 fathoms/

Jumala marshalli (Dall),1919. Pribilof Islands to Unalaska, Alaska. Type locality, off Unalaska in 78 fathoms.

Jumala indentata (Dall),1919. Kotzebue Sound to the Aleutian Islands, also north Japan seas (Dall). Type locality, off the Khudubine Ids.,Bering Sea.

Genus *Liomesus* Stimpson,1865. Type (by original designation), *Buccinum dalei* J. de C. Sowerby.

" Shell of moderate size, bucciniform; with spiral striations or threads; pillar short, twisted; outer lip thickened, not reflected; operculum with an apical nucleus; periostracum conspicuous"

" This genus is similar to *Buccinum* but has an operculum with an apical nucleus." (Grant and Gale, 1931, p. 666).

Liomesus nassula Dall,1901. Bering Sea from the Pribilof Islands to the Peninsula of Alaska, 34 to 121 fathoms. Japan? (Dall). Type locality, 121 fms. near the Pribilof Islands, Bering Sea.

Collecting data: Bering Sea (Lewis).

Liomesus ooides (Middendorff),1848. Okhotsk Sea, also Pleistocene of Yesso, Hokkaido, Japan. (Dall). Type locality: " Sin. Tugur, maris ochotensis (Tugur Bay, Sea of Okhotsk).

Dr. A. Myra Keen advises (Per. Comm. June,1945) that Dall cited the pagination of a separate in the National Museum library. The original pagination in the serial should be cited instead. The correct reference should be Bull. Acad. Imp. Sci. de St. Petersburg, Phys.- Math. Cl., vol.7, p.246; " Beitrage" (not figured), p. 504.

Collecting data: Sitkalidak Island,1931. *** Extension of range eastward across the north Pacific ocean to Gulf of Alaska.

Liomesus ooides canaliculatus (Dall),1874. Icy Cape, Arctic Ocean to the Shumagin Islands (Dall). Type locality, Cape Espenberg, Arctic Ocean.

Liomesus nux Dall,1877. Aleutian Islands to Shumagin Islands, Alaska. Also Japan Seas. Type locality: Aleutian Islands in 10 fms.

Collecting data: Umnak Island, Alaska (G. Willett).

Genus Mohnia Friele, 1878. Type, Fusus mohnii Friele.

" Shell as in Siphonorbis or Plicifusus, but the whole nepionic shell smooth (it is sculptured up to the larval whorls in other species); operculum coiled, pauci-spiral; radula, with one cusp on the rhachidian and two on each lateral tooth; ovicapsules solitary, as in Tritonofusus. (Dall)

Mohnia robusta Dall, 1913. Off the Pribilof Islands, 987 to 1,401 fathoms.
Mohnia corbis Dall, 1913. Off the Pribilof Islands, 1,771 fathoms.
Mohnia frielei Dall, 1891. Off the Queen Charlotte Islands, B.C. in 876 fms.
Mohnia vernalis Dall, 1913. Tillamook Bay, Oregon, to Monterey, Calif. ; 786 to 881 fms. (Dall). Type locality: off Tillamook, Ore. in 786 fathoms.
Mohnia siphonoidea Dall, 1913. Off Pribilof Islands, in 987 fathoms.
Mohnia exquisita Dall, 1913. Bering Sea, off Koniugi Island, Aleutians in 1,766 fathoms.

Genus Ancistrolepis Dall, 1894. Type (by original designation) Chrysodomus eucosmius Dall (fide Grant and Gale who use it as a subgenus of Neptunea, p.657)

" Shell Buccinoid with a short, twisted canal; operculum straight, claw shaped, with apical nucleus." (After Dall) (Grant and Gale).

" Ancistrolepis is distinguished from Neptunea by its short, wide anterior canal. The columella is strongly incurved in the middle. The type species has prominent, widely spaced spiral ribs. The same is true of the type of Beringius Dall, 1886 , though the latter has a higher spire. Perhaps Ancistrolepis should be considered a section or synonym of Beringius"(Grant and Gale, p.657).

Ancistrolepis eucosmius (Dall), 1891. Pribilof Islands, Alaska to Tillamook Bay, Oregon, 67 to 786 fathoms. (Dall). Type locality, off Unalaska Island.
Ancistrolepis eucosmius bicinctus Dall, 1919. Pribilof Islands to Shumagin Islands, Alaska, in 34 to 280 fathoms (Dall). Type locality, southeast of Unalaska.
Ancistrolepis magnus Dall, 1895. Okhotsk and Bering Seas, 25 to 70 fms.
Ancistrolepis californicus Dall, 1919. Fuca Strait to San Diego, Calif. , 152 to 984 fathoms (Dall). Type locality, in 984 fathoms near Cortez Bank.
Grant and Gale state that this is identical with eucosmius.
Ancistrolepis beringianus Dall, 1919. Bering Sea, off Starichkoff Island, 58f

Genus Sulcosinus Dall, 1894. Type (by original designation), Buccinum taphrium Dall, 1891.

" Shell thin, with a deeply channeled suture, strongly reflected lip, and thick parietal callous deposit." (Dall).

Sulcosinus taphrius (Dall), 1891. Bering Sea, off Unalaska, in 351 fathoms.

Genus Exilioidea Grant and Gale, 1931. Mem. San Diego Soc. Nat. Hist. vol. 1, p.665. Type (by original designation), Chrysodomus rectirostris Carp.

" Shell elongate, very slender, with numerous whorls, chrysodomoid nucleus, and a straight canal; periostracum conspicuous, polished; sculpture of numerous fine flexuous axial ribs and spiral striation; aperture small, simple, not lirate within, outer lip thin, sharp, not reflected; inner lip and pillar smooth, without plications or denticles of any sort; operculum long, slightly arcuate, with apical nucleus. (Dall, 1918, description of Exilia)

Several problems are presented here and the last has certainly not been heard. Grant and Gale, following Stewart, 1927, claimed that Conrad's Exilia has a Turrid notch and belongs in the family Turridae. For this reason they described the new genus Exiliodea for our recent species.

However, a more recent paper " A Systematic Study of the Fossil Gastropod Exilia" by Herdis Bentson, University of California Publications, Bull. of the Dept. of Geological Sciences, vol.25, no.5, pp.202-203 discusses the relationship of Exilia to Exiliodea and claims that the statement that Conrad's type species has a Turrid notch is not true and places the entire fossil group under the family Fusinidae. Bentson considers Exiliodea distinct for a number of other reasons.

Dr. A. Myra Keen advises (Per. Comm. June,1945) " Note that the original spelling is Exilioidea , not Exiloidea as Bentson cited it. Because Dr. Bentson made a careful and thorough study of the problem of classification of these gastropods, I am inclined to accept her decisions wherever she has any evidence at all for them, as in her analysis of nuclear differences, etc. The geologic distribution of the faunas involved would confirm her conclusion that Exilioidea is a separate entity from Exilia. The latter is a member of a warm-water fauna that was widespread in the Eocene and persisted to the Oligocene. Then we have no further record until the Pliocene when among a cool-water assemblage a similar-looking form appears. That fact alone should warn one to look for differences rather than resemblances. It might even be possible that Exilia is a member of the Fusinidae while Exilioidea belongs in the Neptuneidae."

Exilioidea rectirostris (Carpenter),1865. Behm Canal, Alaska, to Cape San Quintin, Lower California (Dall). Type locality, Puget Sound (fide Grant and Gale).

Collecting data: Dredged off Redondo Beach, Calif. in 75 fms. in fine gravel and mud (Burch); Forrester Island, Alaska in 50 fms. (G. Willett); off Catalina Island, Calif. in 80 fms. (G. Willett).

Exilioidea kelseyi (Dall),1908. Crescent City,Calif. to San Diego, Calif. 50 to 359 fathoms. Type locality, off San Diego in 124-359 fathoms.

Collecting data: Off Catalina Island, Calif. in 80 fathoms (G. Willett); we are advised by Dr. Keen that there are specimens inthe Stanford University collection from off Crescent City, Calif. in 30 fathoms which is an extension of range northward. Dr. Keen states that these specimens seem to be kelseyi though with stronger sculpture.

Genus Plicifusus Dall,1902. Type (by original designation), Fusus kroyeri Moller (fide Grant and Gale).

Grant and Gale place these species under Section Plicifusus under subgenus Colus under genus Neptunea. However, Plicifusus has been very generally given generic standing, Hirase's Japanese Shells etc. etc.

" Shell strongly plicate axially, smooth or spirally sculptured, usually with an inconspicuous periostracum; nucleus Chrysodomoid; aperture ample, the outer lip markedly flexuous behind, slightly expanded, simple, sharp; the pillar callous, the canal slightly twisted and recurved, moderately long; operculum as in Colus." (Dall,1918).

Plicifusus kroyeri (Moller),1842. Point Barrow, Arctic Ocean south to Vladivostock, Gulf of Peter the Great, in Japan Sea, east coast of Siberia (Eyerdam). Circumboreal. Johnson gives the range in the Atlantic as Greenland.

Collecting data: Vladivostock as reported above by W.J. Eyerdam is a southward extension of range of several thousand miles. Point Barrow (Brower).

Plicifusus arcticus (Philippi),1850. Arctic Ocean, Bering Sea, Aleutians to Shumagin Islands,Alaska.Circumboreal. Greenland. Type locality,Spitzbergen.

Plicifusus johanseni Dall,1919. Point Barrow to Icy Cape, Arctic Ocean. *Type locality*, Icy Cape.
?*Plicifusus verkruzeni* (Kobelt),1876. Arctic ocean to Bering Strait. Circumboreal. *Type locality*, Porsangerfiord (Norway).

Subgenus *Retifusus* Dall,1916. Type (by original designation), *Tritonium jessoense* Schrenck.

" Shell of small to moderate size, with a conspicuous dark usually vernicose periostracum; axially plicate, the surface reticulated by sharply incised spiral grooves; nucleus swollen, chrysodomoid; outer lip flexuous, slightly reflected, sharp, without internal lirae; canal short, recurved, with the siphonal fasciole indistinct; operculum arcuate with apical nucleus." (Dall,1918).

Plicifusus virens (Dall),1877. Bering Sea to Middleton Island, Alaska. Japan? (Dall). *Type locality*, Kyska Harbor in 10 fathoms.
Plicifusus incisus Dall,1919. Arctic Ocean; Bering Sea; east to the Shumagin Islands 38 to 54 fathoms (Dall). Type locality, USFC Sta. 3643, western Bering Sea.
Plicifusus oceanodromae Dall,1919. Petrel Bank, Bering Sea; the Aleutians to the Shumagin Islands (Dall). Type locality, Petrel Bank, Bering Sea.

Subgenus *Microfusus* Dall,1916. Type (by original designation), *Chrysodomus acutispiratus* Sowerby.

" Shell small, with a somewhat villous, inconspicuous periostracum; nucleus smooth, swollen, obliquely tilted, chrysodomoid; subsequent whorls near the apex axially ribbed, the remainder without axial sculpture; spiral sculpture of fine close threading; suture appressed, spire acute; aperture shorter than the spire, with a wide, very short, recurved canal; outer lip simple, sharp; pillar without callous deposit, or marked siphonal fasciole." (Dall,1918).

Plicifusus brunneus (Dall),1877. Port Clarence, Bering Strait, to Nunivak and the Pribilof Islands. (Dall). Type locality, Nunivak Island,Bering Sea in 10 fathoms.

Subgenus *Latifusus* Dall,1916. Type (by original designation), *Chrysodomus griseus* Dall.

" Shell short and broad, whitish, with a dull slightly villous periostracum; arcuately plicate with fine spiral threading; canal and aperture as long as the spire; outer lip strongly flexuous behind, slightly thickened and reflected; pillar short, smooth, with the body coated with callus in the adult; canal short, wide, recurved, with the siphonal fasciole feeble; operculum arcuate, the nucleus apical and in perfect specimens incurved; the apex of all the specimens is more or less eroded, but appears to have been acute and chrysodomoid." (Dall,1918).

Plicifusus griseus (Dall),1890. Bering Sea (27 fathoms) to San Diego,Calif. (636 Fathoms). Typo locality, USFC Sta. 2839, near the islands off Santa Barbara, Calif. in 414 fathoms. Point Barrow, Alaska (W.J. Eyerdam).

Subgenus *Helicofusus* Dall,1916. Type (by original designation), *Chrysodomus laticaudatus* Dall (= *Tritonofusus* (*Plicifusus*) *aurantius laticordatus* Dall)

" Shell small, short, inflated, with an external chalky layer covered with a dark rude periostracum, both usually eroded; the inner shell layer of an orange color; nucleus large for the shell, depressed, domelike, smooth, and of about one whorl; the succeeding whorl or two with short small axial ribs, the later whorls with only fine spiral sculpture, usuallu eroded; aporture as long as the spire; outer lip sharp, flexuous behind, not reflected; body and pillar with a thin callus; pillar short, twisted, abruptly bent to the left with the wide short canal, no siphonal fasciole present; operculum as in Plicifusus." (Dall,1918).

Plicifusus laticordatus (Dall),1907. Bering Sea (33 to 76 fathoms) south to Fuca Strait (559 fathoms). (Dall). Type locality, Sta. 3279, in 41 fms. Bristol Bay.

Genus Colus Roeding,1798. Type (by subsequent designation, Dall,1906) Murex islandicus Gmelin.

" Shell long-fusiform, slender, with numerous moderately rounded whorls, the nucleus Chrysodomoid, the shell structure usually white, often with a chalky external layer under a conspicuous, usually brownish, adherent periosptracum; sculpture spiral, seldom very strong, sometimes nearly obsolete,never axially plicate or ribbed; aperture of moderate size, the outer lip simple, acute, not thickened or reflected, rarely slightly expanded; pillar smooth, the inside of the outer lip not lirate or denticulate; canal varying in length usually somewhat tortuous or, when short, recurved; operculum filling the aperture, formed as in Chrysodomus. Radula like Chrysodomus, the minor cusps variable, the rhachidian tooth always cuspidate. Ovicapsules solitary, lentiform or hemispherical, attached by the whole of the flat side, usually with several enclosed young. Nepionic shells small, generally with the apical whorl inflated, the next succeeding somewhat constricted,and the rest regularly increasing; but the nucleus varies as previously described from inflated and irregular to blunt and regularly coiled, but always smooth." (Dall,1918).

Subgenus Aulacofusus Dall,1918. Type (by original designation), Fusus spitzbergensis Reeve. Proc. U.S.N.M. vol.54, p.217,1918.

" Another group of species, typified by Fusus spitzbergensis Reeve, has a special aspect due to the short canal and the prominence of the spiral ribs separated by chaneled interspaces. It may be called Aulacofusus."

Colus spitzbergensis (Reeve),1855. Circumboreal. Arctic Ocean to Northern Japan and Fuca Strait, 12 to 142 fathoms. (Dall). Johnson gives the Atlantic range " Labrador to the Gulf of St. Lawrence, 1-142 fathoms. Type locality, Spitzbergen. Atka Id., Aleutian Islands (W.J. Eyerdam).

Colus periscelidus Dall,1891. Commander and Aleutian Islands eastward to Sannakh Islands, Alaska. (Dall). Type locality, " off Akutan Islands,Alaska".

Colus herendeeni Dall,1902. Southern Bering Sea, Nunivak Island to the Aleutians and eastward to the Shumagin Islands, Alaska, 41 to 284 fathoms (Dall). Type locality, Bering Sea and Aleutian Islands.

Colus nobilis Dall,1919. Near Pribilof Islands, 60 fms.

Colus calameus Dall,1907. Western Bering Sea off Starichkoff Island, in 632 fathoms.

Colus ombronius Dall,1919. Eastern Bering Sea, from Nunivak Island south to Bristol Bay and the Pribilof Islands (Dall). Type locality, USFC Sta. 3252 in Bering Sea.

Colus bristolensis Dall,1919. Pribilof Islands north and east to Unimak Island,Alaska, 27 to 62 fathoms. (Dall). Type locality, USFC Sta. 3252 in Bering Sea.

Colus osychus Dall,1907. Point Barrow, Arctic Ocean, to Bering Island. Type locality off Bering Island.

Colus roseus Dall,1877. Off Cape Lisburne, Arctic Ocean, 10 to 15 fms.

Colus barbarinus Dall,1919. Southern Bering Sea, off Khudubine Island,53 fms.
Colus sapius Dall,1919. Off Sitka, Alaska, in 1,569 fathoms.
Colus calathus Dall,1919. Near Shumagin Islands, 159 fathoms.
Colus capponius Dall,1919. Bering Strait near Port Clarence.
Colus acosmius Dall,1891. Off Pribilof Islands, Bering Sea (688 fathoms), to Unalaska (399 fathoms). Type locality, USFC Sta. 3329, off Unalaska Is., Bering Sea.
Colus halidonis Dall,1919. Pribilof Islands (81 fathoms) to Monterey Bay, California (633 fathoms). Type locality, off Destruction Island, Washington, in 516 fathoms.

Subgenus Limatofusus Dall,1918. Type (by monotypy), Colus tahwitanus Dall. No type was designated and no formal description of the subgenus given. The following is a description given of the species tahwitanus.

" Shell small, buccinoid, with about six whorls; nucleus eroded, suture deep, not appressed; whorls well rounded; sculpture of fine even uniform grooves with wider flat interspaces over the whole shell; periostracum dull, olivaceous; interior white, outer lip reflected, arcuate; pillar and body erased, axis twisted, almost pervious, canal very short and strongly recurved." Proc. U.S.N.M. vol.54,p.228,1918.

Colus trophius Dall,1919. Nicolas Island, Calif. ,1,100 fathoms.
Colus tahwitanus Dall,1918. Off Tahwit Head, Washington in 178 fathoms.
Colus morditus Dall,1919. Gulf of Georgia, 60 to 200 fathoms.
Colus timetus Dall,1919. Bering Sea, off Unalaska, in 19 fathoms.
Colus dimidiatus Dall,1919. Off Tillamook Bay,Oregon, in 786 fathoms.
Colus severinus Dall,1919. Off Pigeon Point and Monterey Bay, Calif. in 278 to 296 fathoms. Type locality, Bay of Monterey, in 278 fathoms.
Colus pulcius Dall,1919.Arctic Ocean, north of Bering Strait (Healy).
Colus georgianus Dall,1920. Gulf of Georgia, in 60 to 200 fathoms (Dall) Petersburg, Alaska (Oldroyd); Chichagoff Island, Alaska (W.J.Eyerdam)
Colus halimeris Dall,1919. British Columbia to San Diego,Calif. in 60 to 822 fathoms. Type locality, USFC Sta. 4248 in Eastern Passage, near Stikine River, southeast Alaska.
Colus trombinus Dall,1919. Pribilof Islands, Bering Sea in 36 fathoms.

Subgenus Anomalosipho Dautzenberg and Fischer,Res. Camp. scientifiques de Monaco, livr. 37,1912,p.99. Type.- (fide Dall,1918), Sipho verkruzeni Dautzenberg and Fischer (not Kobelt)- Colus dautzenbergi Dall, Atlantic Ocean; Grand Banks.

" Shell solid, of moderate size, the nucleus unknown, the sculpture exclusively spiral, the sutures not constricted, the aperture shorter than the spire, the canal very short, wide, hardly differentiated from the aperture." (Dall,1918, Proc. U.S.N.M. vol.54, p. 218)

Colus martensi Krause,1885. Plover Bay, Bering Strait, 20 fathoms.
Colus adonis Dall,1919. Northern Japan, 25 to 508 fathoms.
Colus conulus Aurivillius,1885. Arctic Ocean north of Bering Strait. Circum-boreal ? (Dall). Type locality, Lat. 66 deg. 58' N, Long. 171 deg. 35' E (error for W?) 21 fms. (note by Dr. A.M. Keen).

Subgenus Latisipho Dall,1916. Type (by original designation), Chrysodomus hypolispus Dall,1891.

" Shell of moderate size, Buccinoid in form, with fine spiral striation or none; no axial sculpture; the periostracum persistent, smooth; the spire short, about equal to the aperture; the canal short,markedly recurved; the outer lip ample,simple,slightly reflected in the adult; the body and pillar callous, smooth; the siphonal fasciole strong with no chink between it and the columellar callus. Operculum as in Colus with apical nucleus. The nuclear whorls as in Colus but small" Dall,1918, Proc. U.S.N.M. vol.54, p.217.

Colus hypolispus Dall,1891. Arctic Ocean (Healy) to the Aleutian Islands and eastward to Shelikoff Strait, Alaska. (Dall). Type locality, U.S.S. Albatross Sta. 3254 in Bering Sea.

Collecting data: Izhut Bay, Afognak Islands, Alaska,1922 (Eyerdam)

Colus errones Dall,1919. Pribilof Islands, Bering Sea (18 fathoms), to Strait of Fuca (308 fathoms). (Dall). Type locality, Bering Sea.

Collecting data: Forrester Island, Alaska in 50 fms. (G. Willett); Port Frederick, Alaska (Kate Stephens); Wrangel Island, Alaska in 50 fms. (H.N. Lowe coll.); Wrangel Narrows and Chichagoff Island, Alaska (Eyerdam).

Colus halli Dall,1873. Nunivak Island, Bering Sea to San Diego, Calif. in 65 to 293 fathoms. (Dall). Type locality, Sanborn Harbor,Nagai.

Collecting data: Wrangel, Alaska in 50 fathoms (G. Willett); Hoonah, Chikagoff Channel, Alaska (Kate Stephens).

Colus jordani Dall,1913. Monterey Bay, Calif., 633 fathoms; Bering Sea 70-100 fathoms; British Columbia, 67-142 fathoms. (Dall). Type locality, Sucia Island, Gulf of Georgia, in 67 fathoms.

Collecting data: Petersburg, Alaska, 30-50 fathoms (G. Willett); San Juan Island, Puget Sound (Univ. of Washington) (G. Willett); Matia Island, Puget Sound (Oldroyd); Izhut Bay, Afognak Island, Alaska (W.J. Eyerdam).

Colus aphelus Dall,1890. Chirikoff Island, Alaska to San Diego, Calif. 290 to 626 fathoms (Dall). Type locality, in 414 fathoms off Santa Barbara county, Calif.

Colus halibrectus Dall,1891. Southern Berning Sea, near Unalaska Island, 351 to 399 fathoms.

Colus clementinus Dall,1919. Monterey Bay to San Diego, Calif., 330 to 704 fathoms. Type locality, between Santa Catalina and San Clemente Islands in 654 to 704 fathoms.

Colus dalmasius Dall,1919. Off British Columbia in 238 fathoms.

Genus Neptunea Roeding,1798. Type (by subsequent designation Monterosato,1872) Fusus antiquus monstr. contrarius Linnaeus. Dr. H.A. Rehder published two notes in the Nautilus regarding the type of Neptunea. See Nautilus vol.56, no.2, p.69,1942.

" Shell moderately large,elongate-ovate to subfusiform, ventricose; sculpture mostly spiral; outer lip usually simple; anterior canal of moderate length, slightly curved."

Subgenus Sulcosipho Dall,1916. Type (by original designation), Chrysodomus tabulatus Baird.

" Shell like Chrysodomus but more slender and elongate and with the whorl in front of the suture conspicuously widely sulcate or tabulate, the nucleus inflated and slightly oblique, the color whitish." (Dall,1918).

Neptunea tabulata (Baird),1863. British Columbia and south to San Diego, Calif. in 46 to 218 fathoms. Type locality, Esquimault Harbor, Vancouver Island.

Collecting data: Off Redondo Beach, Calif. in 75 fathoms mudand gravel bottom (Burch); off San Juan Islands, Wash. (T. Kincaid); Catalina Island, Calif. in 70-100 fathoms (G. Willett); Strait of Juan de Fuca, Wash. (Eyerdam); Orcas Island, Puget Sound in 30 fms. (Dr. Fred Baker); San Juan Id., Puget Sound (Lowe Coll.); San Pedro, Calif. (Lowe Coll.); Redondo Beach (Chaney).

Subgenus Neptunea s.s.

Neptunea amianta (Dall),1890. Pribilof Islands, Bering Sea, to Monterey Bay, Calif. 86 to 795 fathoms (Dall). to Lat. 34, Santa Barbara Islands. Type locality: near Santa Barbara Islands in 414 fathoms.

Neptunea insularis (Dall),1894. Pribilof Islands, Bering Sea, 184 fathoms. Kuril Islands (var.?) (Dall).

Neptunea oncodes (Dall),1907. Petrel Bank, Bering Sea, 54 fathoms. Also the Kuril Islands, 229 fathoms. (Dall). Type locality, in 229 fathoms, Okhotsk Sea.

Neptunea ithia (Dall), 1891. Off Monterey, Calif. 204 to 382 fathoms.

Neptunea smirnia (Dall),1910. From Nunivak Island to Fuca Strait, 57 to 114 fathoms. Type locality, Straits of Juande Fuca.

Collecting data: Victoria, B.C. (W.J. Eyerdam) also (Newcombe).

Neptunea nucea (Dall),1919. Arctic Ocean to Cook's Inlet, Alaska. Type locality, Cook's Inlet, Alaska.

Neptunea phoenicea (Dall),1891. Behm Canal, Alaska to Cascade Head,Oregon. Type locality, U.S.S. Albatross Sta. 2862 off coast of British Columbia.

Collecting data: Wrangel, Petersburg, Forrester Island, Alaska in 40-50 fathoms (G. Willett); Petersburg, Alaska,1918 (W.J. Eyerdam).

Neptunea borealis (Philippi),1850. Arctic Ocean to Avacha Bay, Kamchatka, the Aleutian Islands and eastward to the Shumagin Islands, Alaska in 14 to 110 fathoms (Dall). Type locality:"Mare glaciale ad insulam Spitzbergen".

Neptunea pribiloffensis (Dall),1919. Near Pribilof Islands, Bering Sea, in 52 to 87 fathoms; south and east to Kodiak Island, Alaska, and the Queen Charlotte Islands, British Columbia. Also Japan. (Dall,1921). Type locality, off Pribilof Islands, Bering Sea, in 50-100 fathoms.

Collecting data: Wrangel, Alaska (G. Willett); Petersburg, Alaska in 50 fathoms (G. Willett); Unalaska Island, Aleutians, 1932 (W.J. Eyerdam).

Neptunea vinosa (Dall),1919. Western Bering Sea and Avacha Bay, 16 fathoms .

This species was omitted by Dr. A.M. Keen in " Abridged Check List" being considered outside of our area.

Collecting data: Vladivostock, Eastern Siberia,1928 (W.J. Eyerdam).
*** This is an extension of range southward about 2000 miles.

Neptunea satura (Martyn),1784. Arctic Ocean from Point Barrow to Bering Strait; Plover Bat, southand east to Cape Douglas, Alaska (Dall) to the mouth of Yenisei River, Arctic Siberia (W.J. Eyerdam in Nautilus, vol. 57 p.142). This was an extension of range westward from Alaska of over 3000 miles. The type locality has been stated to be " King George's Sound", Hudson Strait, Labrador by Mrs. Oldroyd. However, the observation was made by the editor in the preliminary discussion that it seemed odd that this species is not listed by any of the faunal lists of the Atlantic. Dr. A. Myra Keen made the following suggestion (Per. Comm. June,1945)

" King George's Sound" is obviously an incorrect type locality. There are several such sounds on the map. Mrs. Oldroyd assumed that one in Labrador was meant, but as you point out, this shell is not recorded from the Atlantic coast. There is a King George Sound in southwest Australia and a George Sound in New Zealand. As many of Martyn's shells of west America , notably the Calliostomas , were attributed to New Zealand, I suspect that the latter is the one he meant."

Collecting data: Bering Strait, Alaska (W.J. Eyerdam). Mr. Eyerdam states " I have several varieties of N. satura besides the typical but am not sure of their status." ; Punuk I.,Ber. Sea (Lewis);Saruma Bay,Japan(Baker)

Neptunea satura behringiana (Middendorff),1848. Plover Bay, near Bering Strait. This species was omitted from the " Abridged Check List" by Dr. A. Myra Keen because it has not been reported on the American side of Bering Sea.

Dr. A. Myra Keen sends some interesting information regarding this species (Per. Comm. June,1945) " The description of Chrysodomus saturus behringianus (Middendorff) on p. 233 of Oldroyd is identical with the one of Volutopsius beringi on p. 186 and applies to the latter. The correct reference follows:

(Tritonium (Fusus) antiquum L. var. behringiana Midd.,1848)

Bull. Acad. Imp. Sci. de St. Petersburg, Phys.-Math. Cl., vol.7, no.16, p.242; figured,1849, " Beitrage" zu Mal. Ross.",(Mem. Acad. Sci. St. Peter--sburg, ser.6, Sci. Nat. vol. 6) p.131, pl.2, figs. 3,4; pl.5, fig.1.

Original description:

" Testa rufescente,abbreviata; anfractibus laevigatus, supra conspicue app--lanatis; canali extus rugoso-striata; apertura mediocriter patula; cauda perbrevis, incurvata. Long. 60 mm, lat.(33)." Whorls 7. Type loc.: Sinus Tugur mar. Ochot.; ins. Schantar (i.e. Okhotsk Sea).

Neptunea satura elatior (Middendorff),1848. Norton Sound south to Unalaska Alaska. Dr. A. Myra Keen states regarding this species (Per. Comm. June,1945 " Unless the original description in the Bulletin differs very much from the " Beitrage" and " Sibirische Reise " usage, this name is unavailable as of Middendorff, for his proposal is of a " form" and is essentially non-bin--omial. In the " Beitrage" he speaks of " forma elatior A'" and elsewhere uses it in a descriptive rather than a nomenclatorial sense. I do not have access to the " Bulletin" descriptions."

Neptunea satura communis (Middendorff),1848. Point Barrow, Arctic Ocean, to Bering Strait. Dr. A.M. Keen remarks on this species " " Beitrage", p.460, pl.5, figs. 5-6, which was cited there as a variety but may be nomenclaturally valid."

Collecting data: Punuck Island, Bering Sea (Lewis) (G. Willett).

Neptunea satura tabularis (Dall),1919. Pribilof and Nunivak Islands, Ber--ing Sea. Type locality, Bering Sea near Nunivak Island.

Neptunea soluta (Hermann),1781. MacKenzie River delta west to Point Barrow and south to Bristol Bay, Bering Sea. (Dall).

Neptunea soluta varicifera (Dall),1907. Smithsonian Misc. Coll. vol.50, p.154). Arctic Ocean, Okhotsk Sea to east coast of Sakhalin Island. Dr. Dall figured this species in Bulletin 112, Pl.9, figs. 6,7 and gave the date as 1920 and only the Arctic range. Dr. A. Myra Keen omitted it from the " Abridged Check List" for that reason. We have the following note from Dr. Keen " Dall apparently overlooked his earlier description. Type Loc.: " Station 5021, on the east coast of Sakhalin Island, and various stations in the eastern part of Bering Sea". Hence, I should not have omitted it in the Check List."

Neptunea lirata (Martyn),1784. Icy Cape, Arctic Ocean, south to Japan on the west, to Puget Sound on the east; and off Point Pinos, California in 958 fathoms (Dall). Type locality given as " King Georges Sound" (see note on this locality under N. satura on p. 21).

Collecting data: Unimak and Kodiak Islands to Wrangel and Petersburg, Alaska , 0 to 50 fathoms (G. Willett); Strait of Fuca, Washington; Sitkali--dak Island, Izhut Bay, Afognak Island, and False Bay, Unimak Island (W.J. Eyerdam); Port Graham, Cooks Inlet, Alaska (Dr. Fred Baker); Glacier Lake, Alaska (Mrs. Kate Stephens) (10 fms.).

Genus Searlesia Harmer,1916 (fide Zool. Record). Type (by original designation), Trophon costifer S.V. Wood.

Grant and Gale use Searlesia as a subgenus of the genus Kelletia.

" Shell solid, fusiform; apex blunt but not bulbous; ornamented by spiral lines or ribs and by strong longitudinal costae; canal usually short, open, straight or bending slightly to the left" (S.V. Wood).

Searlesia dira (Reeve),1846. Chirikoff Island,Alaska to Monterey,Calif. Type locality not given.

This is a common and rather variable species from northern California to Alaska.

Collecting data: Port Orchard, Puget Sound; De Poe Bay, Oregon; Crescent City, Calif. (Burch); Sitka to Forrester Island, Alaska (G. Willett); Bear Bay, Chirikoff Island,Alaska (Kate Stephens); Victoria, B.C. (K. Stephens); Newport, Oregon (Trethewey); Crescent City, Calif. (Chace); Bolinas, Calif. (Hemphill); Duxberry Reef, Calif. (Button); Victoria, B.C. (Kate Stephens).

Family BUCCINIDAE

Genus Buccinum Linnaeus,1758. Type (by subsequent designation,Montfort,1810), Buccinum undatum Linnaeus.

" Shell ovate or oblong, covered with a horny epidermis; spire elevated apex acute; aperture large, oval, emarginate in front; canal wide, very short or a mere oblique truncation of the base of the aperture; columella smooth; inner lip expanded; outer lip usually thin, smooth internally; operculum ovate, nucleus small near the outer front edge." (Tryon).

Mr . George Willett of the Los Angeles Museum gave a report to the club in our Minutes #7, Jan. 1942 on the families Neptuneidae and Buccinidae. A brief summary of his talk was published. A few excerpts from that paper follow. " These two families were formerly combined under the family name Buccinidae, the older of the two names, but are now considered to have family characters. The principal external difference between the two groups appears to lie in the operculum, which is larger with apical nucleus in Neptuneidae, and smaller with lateral nucleus in Buccinidae. In fact, the genus Volutharpa of the latter family, the operculum is so exceedingly small as to be practically imperceptible. In most species of Neptuneidae the outer lip is thin, while in Buccinidae it is frequently thickened and expanded. The family name Chrysodomidae used by Dr. Dall in Bulletin is at least so far as Pacific Coast species are concerned, a synonym of Neptuneidae, the genus Chrysodomus being Neptunea.

The family Neptuneidae is largely boreal in distribution, exceptions being the genera Kelletia,Cantharus,Macron and Elilioidea , with a few species of other genera coming south as far as California in deep water. One example of these is Neptunea tabulata which may be found off our coast in fifty fathoms or more. It also occurs in Pliocene and lower Pleistocene deposits in southern California. Several species and races in this family, some of them of doubtful nomenclatural standing have been described from fossil faunas of various localities. An Atlantic species, Neptunea antiqua, is used in Europe for both food and bait, being known commonly as the " red whelk" .

Two genera of Buccinidae are found on our coast, Buccinum and Volutharpa being restricted to northern latitudes, excepting for species that come farther south in deep water. One species, Buccinum strigillatum , has been taken off San Diego in 822 fathoms, and another B. viridum off the Santa Barbara Islands in 414 fathoms. Apparently no member of this family has been found fossil in California. The genus Buccinum is common in the north Atlantic, and at least one species, B. undatum is used for food. The shells of this genus are peculiarly liable to great variation in size,form and sculpture. This renders the classification of species very difficult."

Buccinum glaciale Linnaeus,1761. Circumboreal. Arctic Ocean to Fuca Strait. Johnson gives the Atlantic range " Greenland to Gulf of St. Lawrence"

Collecting data: Punuk Island, Bering Sea, 15 fms. (Lewis) (Willett); Sitkalidak Island, Alaska,1931 (W.J. Eyerdam)

Buccinum morchianum Dunker,1858. In Nautilus 50:101,102 Mr. George Willett published an article calling attention to the fact that B. baeri morchianum (Fischer) was really published in 1859 and was preoccupied by Dunkers species. This places the species described by Dall as Buccinum glaciale paralleelum in the synonymy of morchianum Dunker, and leaves the smooth form of baeri without a name. Mr. Willett elected not to rename B. baeri morchianum stating that the smooth form is of no significance.

Mr. Willett also pointed out the following " Mrs. I.S. Oldroyd (Stanford Univ. Publ. Geol. Sci., vol.2, part 1, p. 258) followed Dr. Dall in the use of the name morchianum (Fischer). In her plate 27, however, the two figures supposed to represent this form are really B. g. morchianum Dunker. This plate is further complicated by the fact that the numbers on the Buccinum figures and those on two figures of Chrysodomus saturus Martyn are transposed."

Range: Pribilof and Aleutian Islands to Cook's Inlet. Also Kuril Islands. (Dall for paralellum).

Buccinum hertzensteini Verkruzen,1882. Western Bering Sea near Avacha Bay in 58 fathoms.
Buccinum eugrammatum Dall,1907. Petrel Bank, Bering Sea in 42-54 fathoms. Figured by Oldroyd pl.14, fig.1.
Buccinum tenue Gray,1839. Circumboreal. Arctic Ocean southward to Kamchatka to the west , the Aleutian Islands to the east and thence to Fuca Strait. Johnson gives the Atlantic range " Labrador to the Gulf of Maine,42-92 fms. Greenland.

Collecting data: Godhaven, Greenland (Torrell) (Eyerdam).

Buccinum tenue rhodium Dall,1919. Plover Bay near Bering Strait, 8 to 25 fms.
Buccinum tenue lyperum Dall,1919, Southwest Bering Sea in 100 fathoms.
Buccinum plectrum Stimpson,1865. Point Barrow,Arctic Ocean south to Puget Sound. Circumboreal. (Dall). Johnson gives the Atlantic range "Gulf of St. Lawrence to Greenland.". Type locality not known.

Collecting data: Wrangell, Alaska in 50 fms, (G. Willett); Pavloff Bay, Alaska in 13 to 15 fathoms (Lewis) (Willett); Izhut Bay, Afognak Island and Sitkalidak Island, Alaska (W.J. Eyerdam); Chichagoff Island (Norberg).
Buccinum solenum Dall,1919. Bering Sea, Nunivak Island, to north of Unimak Island, in 36 fathoms (Dall), Type locality USFC Sta. 3518, off Nunivak Island, Bering Sea in 36 fathoms.
* Buccinum humphreysianum Bennett,1825. " Northwest America" (Pease*); exotic ? (Dall). Type locality, Harbor of Cork.

An obviously questionable species and omitted from most faunal lists.
Buccinum oedematum Dall,1907, Pribilof and Sannakh Islands, to Tahwit Head, Washington, Type locality, Sta. 3572 near the Pribilof Islands in 368 fathoms.
Buccinum polare Gray,1839, Arctic Ocean and south in Bering Sea to Avacha Bay,Kamchatka, on the west, and to Alaska peninsula on the east.(Dall). Type locality, Icy Cape, Arctic.

Collecting data: Cape Lisbourne, Arctic Ocean in 30 fms. (Lewis)(Willett, Point Barrow, Alaska (W.J. Eyerdam).
Buccinum chartium Dall 1919, off Pribilof Islands in 688 fathoms. Also Japan,
Buccinum pemphigus Dall,1907. Western Bering Sea, off Avacha Bay,682 fms.
Buccinum pemphigus major Dall,1919. Western Bering Sea and south to Japan in 100 fathoms.
Buccinum pemphigus [illegible] Dall,1907, Nunivak,Pribilof,and Unimak Islands, Bering Sea. Type locality Sta. 3254 north of Unimak Island,Bering Sea.
Buccinum viridum Dall,1889, Both coasts of Bering Sea from the Pribilof Ids southward to Santa Barbara Islands, Calif. in 414 fathoms.
Type locality, off Santa Barbara Islands, Calif.

Buccinum planeticum Dall,1919. From the Pribilof Islands, Bering Sea, to the Queen Charlotte Islands, British Columbia (Dall). Type locality, USF C Sta. 3305, southwest of Hagneister Island, Bering Sea.

Buccinum diplodetum Dall,1907. Off Sitka, Alaska, 1,560 fathoms, and Sea Lion Rock, Washington, in 877 fathoms. Type locality, off Sea Lion Rock,Wash.

Buccinum cnismatum Dall,1907. Bering Sea, north of Unalaska, in 300 fathoms.

Buccinum kadiakense Dall,1907. Kodiak Island, Alaska.

Buccinum bulimuloideum Dall,1907. Near the Shumagin Islands,Alaska in 159 fms.

Buccinum rondinum Dall,1919. Southeastern Bering Sea off the peninsula of Alaska, in 169 fathoms. (Dall).

Buccinum castaneum Dall,1877. Sannakh and Shumagin Islands, 20 to 41 fathoms. Type locality, Shumagin Islands in 20 fathoms.

Buccinum castaneum fluctuatum Dall,1919. Pribilof Islands to Unimak Pass and the Shumagin Islands, Alaska in 30 to 56 fathoms (Dall). Type locality, St. George Island, Bering Sea.

Buccinum castaneum triplostephanum Dall,1919. Kyska and Amchitka Islands, Aleutians, in 8 to 11 fathoms. Type locality, Aleutian Islands. Sitkalidak(E.

Buccinum castaneum incisulum Dall,1919. Unimak Pass, Aleutian Islands,56 fms.

Buccinum picturatum Dall,1877. Aleutian Islands eastward to Bristol Bay and Kodiak Island, Alaska, 5 to 60 fathoms.

Collecting data: Atka Island,Aleutians,1932 (W.J. Eyerdam).

Buccinum simulatum Dall,1907. Petrel Bank, Bering Sea, 43 to 54 fathoms. Also northern Japan. (Dall). Type locality, Sta. 4770, on the Petrel Bank, Bering Sea.

Buccinum ochotense (Middendorff),1848. (described as Tritonium). Bull. Acad. Imp. Sci. de St. Petersburg, Phys. Math. p.244; figured ,1851, Sibirische Reise, p. 235, pl.10, figs. 1-2, pl.9, fig.5.

Dr. A. Myra Keen advises regarding the reference " Incidentally, the correct title of the work Dall quotes as " Sibirische Reise" is : " Reise in den Aussersten Norden und Osten Sibiriens," Bd. II, Zoologie,Theil 1; Wirbellose Thiere".

Range: Arctic Ocean north of Bering Strait,and the Pkhotsk Sea.

Buccinum sigmatopleura Dall,1907. Commander and Attu Islands,Bering Sea in 135 fathoms. Type locality, Sta. 4792 off Bering Island.

Buccinum rossellinum Dall,1919. Southeast of Chirikoff Island, Alaska in 695 fathoms.

Buccinum strigillatum Dall,1891. Fuca Strait (178 fathoms) to San Diego (822 fathoms) and Guadelupe Island. (Dall). Type locality, off Guadelupe Island, Lower California in 167 fathoms.

Buccinum strigillatum fucanum Dall,1907. Straits of Fuca and Oregon coast. Type locality, Straits of Juan de Fuca in 125 fathoms.

Buccinum sericatum Hancock,1846. Arctic Ocean. Circumboreal. Johnson gives the Atlantic record as " Davis Strait- Circumboreal".

Buccinum normale Dall,1885. This species is generally listed as a subspecies Buccinum angulosum normale Dall,1885.' Dr. A. Myra Keen notes the reference " Ray's " Polar Expedition" is : 48th Congress, 2nd Session, House Exec. Doc. 44. The type locality is Point Barrow."

Range as given by Dall is Point Barrow to Kotzebue Sound.

Collecting data: Point Barrow, Alaska (W.J. Eyerdam).

Buccinum physematum Dall,1919. Bernard Harbor, Arctic Coast, west to Point Barrow and south to Bristol Bay, Alaska. (Dall). Type locality, USFC Sta. 3253 in Bering Sea.

Buccinum angulosum Gray,1839. Bernard Harbor, Arctic Coast, west to Point Barrow and south to vicinity of Bering Strait. Type locality, Icy Cape.

Collecting data: Cape Lisbourne, Arctic Ocean in 30 fms. (Lewis) (G . Willett); Point Barrow, Alaska (W.J. Eyerdam).

Buccinum angulosum cnismatopleura Dall,1919. Proc. U.S.N.M. vol.56, p.328. Point Barrow, Arctic Ocean, Alaska and between Cape Beaufort and Cape Lisbourne. Type locality, Point Barrow on the beach.

This species was omitted from Dall's list in Bull. 112 but the description is given in Oldroyd and figured pl.12, fig.4,

Collecting data: Point Barrow, Alaska (Brower).

Buccinum angulosum subcostatum Dall,1885. Note reference under B. a. normale Point Barrow, Alaska.

Buccinum angulosum transliratum Dall,1919. Point Barrowand southward to Bristol Bay. (Dall). Type locality, Port Belcher, Arctic coast of Alaska .

Collecting data: Point Barrow, Alaska (W.J. Eyerdam).

Buccinum fringillum Dall,1877. North end of Nunivak Island, Bering Sea.

Buccinum tenellum Dall,1883. Sea Horse Islands, Arctic Ocean, south to the Aleutian Islands. (Dall). Type locality, Cape Etolin, north end of Nunivak Island, Bering Sea.

Collecting data: Bering Sea; Arctic Ocean off Cape Lisbourne in 30 fath. (Lewis) (Willett).

Buccinum baerii (Middendorff),1848. (described as Tritonium) Bull. Acad. Sci. St. Petersburg, Phys. Math. Cl. vol.7, no.16,p. 243; figured 1849, in the Beitrage as cited by Dall (Dr. A. Myra Keen).

Range: Commander, Aleutian and Kodiak Islands. (Dall).

Collecting data: Aleutian Islands to Petersburg and Forrester Island, Alaska. The latter are more slender and higher spired (G. Willett); Prince William Sound and Kodiak Island (W.J. Eyerdam).

Buccinum fischerianum Dall,1871. St. George Island, Pribilof Group, Bering Sea.

Buccinum tenebrosum Hancock ,1846. Bering Strait. Circumboreal. (Dall). Type locality, west coast of Davis's Strait. Johnson gives Atlantic record as Davis Strait.

Buccinum ciliatum Fabricius,1780. Circumboreal. From Point Barrow,Arctic Ocean, south to the Aleutian Islands and eastward to the Shumagins. On the Atlantic from Greenland to the Newfoundland Banks. (Dall).

Buccinum ovulum Dall,1894. Amukhta Pass, Aleutians, in 248 fathoms.

Buccinum aleuticum Dall,1894. Near Unimak Island , 50 fathoms.

Buccinum percrassum Dall,1881. Arctic Ocean north of Bering Sea. Type locality, Bering Island.

Buccinum chishimanum Pilsbry,1905. Bering Island, Bering Sea. Also Japan. Type locality, Etoro, Chishima, Kuril Islands, Japan.

Genus Volutharpa Fischer,1856. Type (by monotypy), V. deshayesiana Fischer (= V. ampullacea (Middendorff).

" Shell ventricose, thin; spire short, body-whorl and aperture very large. Operculum usually wanting; when present, at first with apical nucleus, afterward becoming annular." (Tryon).

Volutharpa perryi (Jay),1855. St. Paul Island, Bering Sea (Palmer). Also Japan. Type locality, Bay of Yedo, Japan.

Dr. A. Myra Keen notes regarding the reference as follows : " Report of the Japan Expedition" is Senate Exec. Doc. no.79, 33d Congress, 2nd session, vol.12, pt. 2, 1844-1855."

Collecting data: Kii, Japan (W.J. Eyerdam).

Volutharpa ampullacea (Middendorff),1848. (described as Bullia). Bull. Acad. Imp. Sci. de St. Petersburg, Phys.-Math., Cl, vol.7, no.16, p. 246; figured , " Sibirische Reise",1851, p.237, pl.17, figs. 1-3.

Range: Bering Strait to Fuca Strait (Dall).

Collecting data: Unalaska,Petersburg, Ketchikan, Alaska (G. Willett); Izhut Bay, Afognak Island,1922 and Shumagin Islands, Alaska,1925 (Eyerdam); Alert Bay, B.C. (Oldroyd); Bear Bay, Alaska; Abashiri,Hokkaido,Japan (Baker).

Volutharpa ampullacea acuminata Dall,1871. Am. Jour. Conch. vol.7, p.104.
Type locality, Sitka, Alaska.
Collecting data: Sitkalidak Island, Alaska,1921 (W.J. Eyerdam).

Additions and Corrections

Dr. Joshua Baily Jr. advises regarding the type of Plicifusus . It is Fusus krøyeri. " A decision of the International Commission makes it necessary to preserve the diagonal line across the o in krøyeri."

Buccinum tenellum Dall in Kobelt,1883.
Conchylien Cabinet, ed.2, vol.3, pt. 1c(325), p.88, pl.91,fig.8.
The above is the correct reference for this species on the advice of Dr. A. Myra Keen. Check page 26.

The following species have not been reported north of San Diego but may be of interest. They are from the southern fauna and are discussed in Mr. A.M. Strong's notebook.

Genus Pyrula	
Pyrula patula Broderip	Gulf of California to Panama.
Genus Hanetia	
Hanetia pallida Broderip & Sowerby	Gulf of California to Panama
Hanetia anomala Reeve	Magdalena Bay to Peru
Hanetia fusiformis Blainville	Panama to Peru
? Hanetia modificata Reeve	Gulf of California
Hanetia elegans Dall,1908	Panama.
Genus Euthria	
Euthria plumbeus Philippi,1841.	Chile
Genus Austrofusus	
Austrofusus alternatus Philippi,1841.	Central America
Austrofusus fontainei d'Orbigny,1841.	Peru and Chile
Genus Metula	
Metula amosi Vanatta,1913	Acapulco to Panama
Metula metula Hinds,1844	Central America
Genus Truncaria Adams and Reeve,1853.	
Truncaria brunneocincta Dall	Panama

Family COLUBRARIIDAE.

Genus Colubraria Schumacher,1817.

There seems to be no described species of this genus north of San Diego although Dr. Dall reported a Colubraria sp. from off La Jolla, San Diego County, Calif. in 199 fathoms. A number of species have been described from the southern fauna. However, there seems to be considerable disagreement about the proper position of a number of these species. The following list from Mr. A.M. Strong's notebook may be of interest.

Colubraria (Epidromus) jordani Strong	Socorro Island to South Seas
Colubraria (Epidromus) anomala (Hinds),1844.	Central America
Colubraria (Epidromus) reticulata (Blainville)	? Galapagos ? Mediterranean
Colubraria (Epidromus) sowerbyi (Reeve),1844	? Galapagos ? Red Sea
Colubraria aphrogenia Pilsbry and Lowe,1932.	Panama
Colubraria lucasensis Strong and Hertlein	Cape San Lucas.

Genus Engina Gray,1839. Type (by subsequent designation, Gray,1847), Engina zonata. Reference- Bartsch,1931, Proc. U.S.N.M. No. 2881, vol.79, Art. 15, pp. 1-10, pl.1 " Descriptions of New Marine Mollusks from Panama With a Figure of the Genotype of Engina". The figures in this paper are good and should be studied by all interested in this group.

" Shell ovate-conic; spire sharp, with longitudinal nodulous ribs, decussated by revolving lines; aperture narrow, with several oblique plications in front; outer lip rather thick, inflected or callous in the middle, crenulated within" (Tryon)

Engina maura (Sowerby),1832. Proc. Zool. Soc. London for 1832, p.117. Reference- Pilsbry and Lowe, Proc. Acad. Nat. Sci. Philadelphia, vol.84, p .63 pl.7, figs. 1 & 2. This is the species listed by Dall and many others as Engina carbonaria(Reeve). Pilsbry and Lowe state of this species :
" The neotype from Gardner Bay, Hood Island, Galapagos (No. 153525 ANSP) here figured measures 19.3 mm. long, 12.2 wide, being almost exactly the size of Sowerby's type (0.8 x 0.5 inch). It is black, with a few small whitish and yellow spots. Sculpture of coarse rounded axial ribs, 8 on the last whorl, crossed by 8 or 9 spiral cords which form elongate tubercules on the ribs and are almost obsolete between them; three of these cords are larger on the prominent peripheral region, a subsutural cord and those below the periphery being smaller. The intervals between the cords are distinctly striate spirally. The aperture is bluish white. Within the outer lip there are six teeth. The second and third from above being connected and prominemt. On the columellar and parietal margin there is a series of smaller tubercles and wrinkles."

Range: Dall gives the range of the species as San Pedro, Calif. to Panama and the Galapagos. To Manta, Ecuador (Stearns, Proc. USNM, 14, p . 317) noted by the -4 lat. in Keen's " Abridged Check List".

However, we are hesitant about listing the collecting records for this species off the California coast because of the general feeling as stated by Mr. George Willett of the Los Angeles Museum " I think Dall's records for carbonaria probably are referable to strongi."

However, the following collecting records by H.N. Lowe are no doubt correct : San Juan del Sur, Nicauragua; Manzanillo,Mexico; Puntarenas, Costa Rica; Montijo Bay and Taboga Island, Panama. W.J. Eyerdam records the species from Corinto, Nicauragua in 1939.

Engina strongi Pilsbry and Lowe,1932. Proc. Acad. Nat. Sci. Phila. vol. 84, p. 65, pl.16, fig.12. Type locality off Catalina Island, Calif. in 50 fms. Range: Catalina Island, Redondo Beach and San Diego, Calif.

" The shell is solid, fusiform, ivory yellow, marked with carob-brown spots on the right side of each axial rib. Nucleus lost. Sculpture of slightly retractive axial ribs, 10 on the last whorl, crossed by subequal, rounded spiral cords more prominent on the ribs, thirteen on the last whorl, three on earlier whorls; in the type a spiral thread running between first and second cords. Aperture white, passing into a rather narrow canal below. Outer lip thick, with about six rounded tubercles within. Inner lip with a low fold near the posterior angle and a very small one above the angle defining the anterior canal."

Collecting data: Catalina Island, Calif. in 50 fathoms (H.N. Lowe); Redondo Beach, Calif. in 25 and also 50 fathoms (Burch); San Diego, Calif dredged (Gripp).

The following list of species of the genus *Engina* covers the entire coast. It is taken from Mr. A.M. Strong's notebook.

Engina strongi Pilsbry and Lowe,1932. Redondo Beach,Catalina, and San Diego.
Engina ferruginosa (Reeve),1846. Lower Calif. to Panama.
Engina senae Pilsbry and Lowe,1932. Gulf of Calif. to Acapulco.
Engina rufonotata (Carpenter),1864. Gulf of Calif. to Magdalena Bay.
Engina pulchra (Reeve),1846 (*reeveana* C.B. Adams) ? Gulf of Calif. to Panama.
Engina maura (Sowerby),1832. San Pedro, Calif. to Manta, Ecuador.
Engina jugosa (C.B. Adams),1852. Panama.
Engina contracta (Reeve),1846. Panama to Ecuador.
Engina pyrostoma (Sowerby),1832. Panama.
Engina livida (Sowerby),1832. Panama
Engina heptagonalis (Reeve),1846. Panama
Engina tabogaensis Bartsch,1931. Panama
Engina panamensis Bartsch,1931. Panama
Engina litharium Dall, Galapagos
Engina mantaensis Bartsch,1928. Ecuador
Engina earlyi Bartsch & Rehder,1939. Galapagos

Genus Caducifer
Caducifer crebristriatus Carpenter,1856. Panama.
Caducifer tabogaensis Pilsbry & Lowe,1932. Panama
Caducifer thalcia Pilsbry & Lowe,1932. Galapagos.

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Professor Louis Brand, University of Cincinnati, Cincinnati 21, Ohio sent the following letter :

The following is a partial list of the shells collected by my daughter Mrs. Sara Brand Marcy at Arica, Chile (1944-45). Besides these there are a number of species of *Fissurella* and *Acmaea* that I have not determined; also some small bivalves. *Pecten purpuratus* Lamarck was not found at Arica but my daughter obtained single valves of this species from Iquique, Chile.

Concholepas peruviana Lamarck
Cymatium rude Broderip
Calyptraea trochiformis Gmelin
Calyptraea strigata Broderip.
Discinisca lamellosa Broderip
Fissurella crassa Lamarck
Fissurella nigra Lesson
Fissurella concinna Philippi
Fissurella darwinii (?) Reeve
Fissurella exquisita (?) Reeve
Littorina peruviana Lamarck
Mitra chilensis Kiener
Murex crassilabrum Gray
Nassa escalae Philippi
Thais biserialis Blainville
Thais chocolata Duclos
Turritella cingulata Sowerby
Oliva peruviana Lamarck
Tegula atra Lesson
Scurria scurra Eschscholtz

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Mr. W.J. Eyerdam, 7531 10th Ave., N.E., Seattle 5, Washington " I note that you will publish a list of the marine shells collected at Arica, Chile by the daughter of Dr. Louis Brand. This is of interest to me because I spent three days there and collected a few shells, although at the time I was there the tides were not very good. I am sending you a list of 24 species of shells that I took at Arica and hope you will include them together with the list you intend to print next month.

The beach at Arica is very sandy but at extreme low tide, outer reefs are partially exposed. The most conspicuous land mark on the shore is the great Morro Rock where the Peruvian garrison was routed and almost anniliated by the ferocious onslaught of the Chilean soldiers in the Tacna-Arica war."

Marine Shells Collected at Arica, Chile in February,1938 by W.J.Eyerdam

Mytilus magellanicus Roeding
Mytilus algosus Gould
Brachidontes purpuratus Lamarck
Brachidontes granulatus Hanley
Marcia rufa Lamarck
Protothaca thaca Molina
Semele solida Gray
Mulinea edulis King
Chiton latus Sowerby
Enoplochiton niger Barnes
Metomura echinata Barnes
Tonicea (Fannettia) disjuncta Frembly
Fissurella limbata Lesson
Fissurella latemarginata Sowerby
Scurria parasitica d'Orbigny
Tegula (Chlorostoma) atra Lesson
Tegula (Chlorostoma) tridentata Pot. Mc
Crepidula dilatata Lamarck
Trochita radians Lamarck
Turritella ungulata Lamarck
Thais (Stramonita) biserialis Blain.
Mitra (Atrimitra) maura Broderip
Oliva peruviana Lamarck
Discinisca lamellosa Broderip

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Note from Thomas A. Burch " Figure 465 labelled Mactra nasuta in Johnson and Snook " Seashore Animals of the Pacific Coast" is definitely not M. nasuta , and is undoubtedly a species of Spisula."

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New Publications Received.

Nautilus Vol. 58, No.4, April,1945. There are several papers in this issue of particular interest to us. Dr. Joshua L. Baily Jr. gives a very clear discussion of the matter we handled under Carditidae. The title of the paper is " Cardita (Cyclocardia) longini, new name for Venericardia (Cyclocardia) nodulosa Dall,1919.". This is the species that we called Cardita bailyi for which this writer owes Dr. Baily an apology for not first asking him to suggest a new name because we were entirely indebted to Dr. Baily for the information that C. nodulosa Dall was preoccupied. If it were as simple as withdrawing the motion in parliamentary procedure that would gladly be done. However, the interesting fact remains that there were something like 1200 copies of the first papers distributed literally all over the world. Between us we seem to have named it very thoroughly. About the only redeeming feature of the affair seems to be that the species is so exceedingly rare that very few collectors will ever have occasion to be concerned about giving it any name at all.

An interesting note by Dr. Pilsbry calls attention to the fact that Tellina panamanensis Li ,1930 was evidently intentionally spelled that way and therefore is not homonymous with Tellina panamensis Philippi,1848. Therefore the name Tellina liana Hertlein and Strong,1945 was not needed and will be synonymous with panamanensis Li.

The description of Stenacme floridana, new genus and new species is interesting. Dr. Pilsbry states that it is closely related to the Amphibola of Australia,New Zealand, South Africa etc.

The Journal of Conchology, vol.22, no.6, May 31,1945 , the organ of the Conchological Society of Great Britain and Ireland has been received. Among the several fine papers in this issue there are none touching our west American fauna particularly. There is an interesting account of Edgar Allan Poe's " Conchologist's First Book" by Colin Matheson.

Mollusca, vol.1, no.5, June 10,1945, published by Paul H. Reed, Tavares, Florida is at hand. Dr . W.J. Clench has a good paper dealing with the Harvard Navassa Expedition. Dr. Henry van der Schalie has a paper on " What has happened to snails of the genus Io." And a newcomer to the current writers is D.H. Kennelly, Port Elizabeth, South Africa with an account of " Shell Collecting in South Africa".

" Catalogo de los Molluscos Marinos de Puerto Quequen" by Alberto Carcelles is more than a mere check list of the molluscan fauna of Argentina. The paper , 78 pages and 16 pages of plates. This may be purchased for $2.40 in the money of Argentina from the Director del Museo de la Plata, La Plata, Republica Argentina.

The Fisheries Research Board of Canada, Ottawa, Canada publish frequent articles on mollusks. Their List of Publications is rather extensive and many of them are very well worth adding to your library.

One paper that has been published since we worked on the Veneridae last year is " The Spread of the Japanese Little-Neck Clam in British Columbia Waters" by Ferris Neave, Progress Reports of the Pacific Coast Stations- No. 61 which also includes an article on the Butter Clam. The species we listed as Venerupis philippinarum (Adams and Reeve) is reported to be spreading both north and south of Ladysmith where it was originally found. Many localities are listed with the statement " On the tide-flats of Ladysmith harbour, where it was originally discovered, it is now probably more abundant than any other of the larger clams, and the bright yellow larvae are frequently in evidence in collections of plankton made during the summer months. The species is now known to occur as far south as Senanus Island, Saanich inlet... North of Ladysmith the writer has found the species at False Narrows, Departure Bay, Nanaimo, Nanoose bay, False Bay, Lasqueti island, and Bargain harbour , near Pender harbour"

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Lucrecia Garcia Castilla, 15 No. 351, Vedado, Habana, Cuba. " I am very interested in collecting land, fresh-water, and marine shells and I am writing you to know if you have specimens to sell." Perhaps some of our members may be interested in answering this note.

Dr. Harry S. Ladd, U.S. National Museum, Washington 25, D.C. Former address was Rolla, Missouri.

Earl C. Huffman, 356 Stanton St., Pasadena 3, Calif. Earl has been on the sick list for the past several weeks but is recovering in good order. He is very obviously a floriculturist as well as a conchologist. He tells of his Epiphyllium which had 35 blossoms at one time and none under 8 inches

Morris K. Jacobson, (summer address only), c/o Dresher, Locust Avenue, Peekskill, N.Y. He reports that during the past winter he completed quite a pretentious shell cabinet (wonder how he got the lumber) and is using for trays the boxes of Regent cigarettes. His friends smoking Regents are invited to save them. Really sounds as if he meant it too which is almost good for a laugh anyplace these days. The editor is now rolling his own out of pipe tobacco being unable to get Bull Durham much less any kind of ready mades. Jacobson has also been trying to dredge in Jamaica bay with a row boat but has not had much luck. Nothing wrong with a good row boat. Suggest that he try another bay.

Mrs. Gray Hackney, Atlantic Beach, N.C. is the summer address only.

George P. Kanakoff, 4315 Sunset Drive, Los Angeles 27, Calif. We are glad to hear from George again. He is disposing of all of his foreign shells and will henceforth concentrate on west coast material.

Professor J. Harlan Johnson, Colorado School of Mines, Golden, Colo. wishes to send all possible information on the molluscan fauna of the Mariannas to Lt. (j.g.) R.B. Travis, X36 Ind. Dept., N. 926 F.P.O. San Francisco.

Mr. and Mrs. Edward Cameron, 695 Haverford Ave., Pacific Palisades, Calif. writes that they are spending some time now at their boat c/o Fleitz Bros., 3242 Kerckhoff Ave., San Pedro, Calif.

Mr. and Mrs. Morris Schick, Schick Cactus Gardens, 715 S. Central Ave., Glendale 4, Calif. We miss them at the meetings these days but glad to hear that they are well and keeping up with their shells.

Thomas A. Burch, M.D. graduated from the School of Medicine, University of Southern California, on June 23. He will start his internship at the U.S. Public Health Hospital at San Francisco on July 1. At the graduation exercises he was commissioned a first lieutenant in the army medical corps but will be on inactive status until he completes his internship. His address for the next nine months will be : Dr. Thomas A. Burch, U.S. Marine Hospital, San Francisco, Calif.

Walter J. Eyerdam, Oceanic Fisheries Co., Port Vita, Kodiak Island,Alaska. " I am here at the herring saltery now 2 weeks back at my old job as cooper and assistant curer. It is quite a relief to be back in Alaska after over 3½ years on swing shift at the ship yards as chipper and caulker. I have been in Alaska about 15 times doing this work and always found some time to study nature and especially the marine life. The herring will start to come within the next two weeks and then it will be long hours of hard work. Up here the weather is either lovely or bad. The flowers are coming out everywhere along the slate sea cliffs and I collect them every evening after work and dry the blotters on the kitchen stove. We have a wonderful cook and the food is just perfect. At this camp we are fed every 4 hours when working long hours and plenty of food is on hand at all hours of the night. Still the cook asks if we are getting enough to eat. No food rationing or points in Alaska.

After returning from the big botanical excursion to South America in 1939 I came right up here, so I am quite familiar with the plants as I collected about 1000 sheets at this place and about 2000 sheets at Thum Bay, Knight Island in 1939 and 1940 during spare time. This includes also large series of the mosses, lichens and liverworts. Most of these plants have been disposed of since through exchange with other botanists. In 1931 I spent the whole summer collecting plants on Kodiak island. Now I am collecting them all over again.

This part of Raspberry Strait is poor in shells. During the first few days I could only find about a dozen common species. Last Sunday P.M I went across the strait and found a lot more including a dozen nice rock oysters, Pododesmus macroschisma living in a large tide pool on top of small pieces of slate covered with nullipores. This is the first time I have found them on top of small stones. Always before they were under boulders or large flat slabs of rock. More important than this is a new geographical record for the Minutes. I have found quite a number of Pecten caurinus along Raspberry Strait on both Afognak and Raspberry islands. The previously known farthest north range is Wrangell Narrows, S.E. Alaska in Dall's report. This makes an extension of the range nearly 1000 miles northwestward. Now I have 47 of the shells already.

Today which is Sunday I made a long hike along the beach. No rare shells were found, but the prize was a fine large specimen of Neptunea lirata (Martyn) , near pribiloffensis. Numerous very large basket cockles Clinocardium nuttallii were on the beach at low tide. I never saw so many big ones before. One mystery that I have wondered about for years was solved today. Millions of large empty shells of butter clams and cockles are scattered along the strait. The beach ground is very shallow so I had concluded that the havoc to the clams was caused by sudden freeze outs when the tide was low. This phenonenon I have seen several times in Alaska and Patagonia but it wasn't the answer to the local anihilation of the mature clam population. The devastation as I observed today in numerous cases was caused by the voracious starfish Pycnopodia helianthoides or 20 rayed starfish, which is the largest species in the world. They simply plaster the clam beds with their ubiquitous presence and scoop our depressions in the sand until a butter clam is found. The starfish quickly inverts his stomach and engulfs the clam, even the largest cockles and in a short time he throws out the empty shell. This is a perfect example of nature's balance because without other enemies in this shallow sand beach the clams would all perish through extreme over crowding.

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Dr. H.R. Hill of the Los Angeles Museum sent us the following notice.

At a meeting held at the Los Angeles Museum the afternoon of Sunday June 17th, the Pacific Shell Club was organized and officers elected. There were twenty present- mostly boys and girls of high school age. Officers chosen were President- Ivan Goyette of Mt. Carmel H.S. Vice-President- Arnold Kind of Manual Arts H.S. Secy. Treas. - Ernest Healy of Los Angeles H.S. Dr. Howard R. Hill is acting as sponsor for this group of young shell enthusiasts and it is hoped that many will eventually " graduate" into the older organization " The Conchological Club of Southern California"

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Mr. and Mrs. A.W. Gillis,1904 N. Madison, Pasadena 6, Calif. Note new address. " We are so glad to send in the enclosed. My loan collection which has been at Westmont College came back home last week and I am sure glad to think of shells again. We have bought a little home here in Pasadena for Mr. Gillis is better here and his work is in this part of the country... Some day we may be able to come to the club again."

Miss Ruth E. Coats, Tillamook, Oregon. 702 E. First St. " Please find enclosed my check for $10.00, $5.00 of which is my donation for the publication of the " Minutes" and $5.00 for a copy of the Distributional List, Part I, Pelecypoda. I would'nt want to miss one number of the " Minutes" and find them very interesting."

Mrs. Effie M. Clark, P.O. Box 511, Yuba City, Calif. We are certainly going to miss our efficient secretary but the above is to be her summer address. She will be back with us in the fall.

E.V. Edmonds, 611 Elm Ave., San Bruno, Calif. This is a temporary address for " Eve" who is just getting established on a new assignment in northern California. The Edmonds family is still here although Don is expecting to get his orders to leave for Honolulu any day and, of course, Bob is in the army serving in India.

Mrs. Elsie Post Betts, Post Ranch, Terra Bella, Calif. " Enclosed please find $2.50 for subscription to the " Minutes" which I have been enjoying very much"

Lieutenant V.D.P. Spicer,401 Vermont Ave., Berkeley, Calif. " Am still marking time as the lack of gasolene keeps me from ... and duties at the University take all the time. When the war ends will be able to play again and I am impatiently waiting for a chance to search for the as yet unexplored collecting field."

Mr. John Strohbeen,315 King St.,Santa Cruz, Calif. " Enclosed find $2.50 for the Minutes and am sure glad to be on the mailing list. I get a big bang in reading the news from all of you fellows. Now adays a fellow only can read about what the other fellow does. No gas so we have to stay home but our day will come and also my retirement, then shells look out. I'll get a diving suit- maybe- Well at least I can stick my head under water and watch A. Smith- that will help. Hope you are having the Turvers at your meetings."

Dr. Henry van der Schalie,Museum of Zoology, University of Michigan, Ann Arbor, Michigan. " ... We have had to concentrate because of our geographic position, on land and fresh-water shells but we do have an interest in building our marine collections so as to give the widest range for the reference of interested students who may want to study marine material. Any help you or your conchological friends can give will always be much appreciated."

Dr. E.W. and D.S. Gifford, 2535 Le Conte Ave., Berkeley 4, Calif. " We wish to tell you how much we like your handling of the family Olividae in the June number of the Minutes, The family presents a lot of knotty problems, but these may be largely man-made through the custom of slapping a name on every variant.

We have six species of olives from Rocky Point Bay and four species from Guaymas. There are some local differences. Thus, the *Oliva spicata* from the former are more angular or shouldered; the *Agaronia hiatula testacea* (we doubt that the subspecific name is warranted) from the north largely lack the pink band that appears in the Guaymas specimens. *Hiatula* also comes from West Africa, specimens being indistinguishable from the West American ones.

After we've done some more Mexican collecting we hope to publish in " The Nautilus" another variational study.

Our compliments on the masterly treatment of a difficult group. We like the way you present the problems and opinions."

Mr. J. Holland Vernon, State College, Hays, Kansas. Mr. Vernon is apparently interested in buying shells. Perhaps some of the members will be interested.

Dr. B.R. Bales, 149 West Main St., Circleville, Ohio. " I am herewith enclosing some of the root of all evil to cover my subscription to the " Minutes" for the coming year. I think you have adopted a mighty good plan when you make a definite charge for this excellent publication. It does not take a mathematician or a New Deal so called " economist" to arrive at the conclusion that in addition to the immense amount of work, it also costs a pretty penny to publish and mail " The Minutes" each month. By making a charge, those who are only mildly interested, will be eliminated from the subscription list. It is a well known fact that when a fellow's religion does not reach as far down as the pocket in which he keeps his wallet he's got a phony religion and if a sheller dont appreciate " The Minutes" enough to pay for them, his interest is only superficial and the sooner he is off the mailing list, the better it will be for all concerned. However, my bet is that you will lose but few subscriptions for I am sure that there is nowhere the customer gets so much for his money.

Word from Florida is that the Everglades have been on fire for months; the Royal Palm State Park has been burned out and it looks bad for many of the hammocks where the *Liguus* have lived for generations. No doubt many varieties will be exterminated. I think the variety *farnumi* was lost when a fire consumed the one hammock on which it was found, and these fires may exterminate other forms."

Mr. Ralph W. Jackson, Route No. 1, Cambridge, Maryland. Mr. Jackson received a copy of our Minutes in torn condition also. Hereafter we will return to rolling them. Let us know if there is any more trouble when sending them this way. Mr. Jackson flatters our publication by his eagerness to complete his file of them. Our earlier issues are long out of print. If any of the members have odd copies or series of the earlier ones we will be very glad to hear of them and have them.

" Thank you for sending what you could of the back issues of the Minutes. Would you mind running a list of what I lack with offer to purchase? My file lacks the following: 1,2,3,7,8,9,10,11,12,13,15. "

Dr. William L. Lloyd, Cabrillo Marine Museum, San Pedro, Calif. We are flattered that Dr. Lloyd thinks of our papers this way " We are keeping them on file and some day will work up an index so we will be able to better find what we want."

Dr. T. VanHyning, The Florida State Museum, Gainesville, Florida. And we are sincerely flattered again " ... And as soon as your next number , number 50 would come out, I want to bind the whole."

ADDITIONS AND CORRECTIONS Minutes #50 pp 5 to 10 inc.

After cutting the stencils on the genus Fusinus we received the following letter from Mr. Allyn G. Smith. His conclusions will be of special interest to compare with the opinions offered in the first papers.

" Classification of Fusinus into subgenera can be done best by careful examination of the nuclear whorls, more or less following Grabau. We think most of our West Coast species found north of San Diego fall into two subgenera- Aptyxis and Barbarofusus. Aptyxis, type F. syrcusanus (from the Mediterranean) includes F. luteopictus and F. taylorianus from the Gulf. Barbarofusus,which is characterized by a bulbous , overhanging nucleus, includes F. barbarensis (the subgeneritype), F. arnoldi, F. kobelti, F. monksae, and others. We have found it difficult to find specimens that show the characteristic Barbarofusus nucleus as most specimens have the tip of the shell eroded or missing, or covered with coralline. Lower Californian Fusinus species- that is, some of them- fall into other subgenera that are not a part of the present problem. The following brief comments may give you an idea of our present views.

F. arnoldi (Cossmann),1903.

This is a common fossil from the Upper San Pedro Series, Pleistocene. As the type of F. robustus Trask was lost in the San Francisco fire of 1906, and as Cossmann did not designate a new type, we propose to designate a neoholotype from the Stanford Collection collected by Delos Arnold, and figure it. Arnoldi and barbarensis are two totally distinct species, not at all related, as stated by Grant and Gale. Also, we think that true arnoldi has so far been found only as a fossil. There are living species that are related, and furthermore we have examined a fossil lot that are undoubtedly intermediate between arnoldi, as we restict it, and the common Monterey Bay species. There is no good figure of what we call arnoldi, which is a fairly large shell, somewhat tabulate, and heavily nodose, especially on the early whorls. Arnold's Pl.4, fig.7 is a fairly good one, however.

F. barbarensis (Trask), 1855

Dall, Arnold, and Grant and Gale all agree on this species as being long-spired and having a long canal. Arnold's figure is very poor. It was first found fossil at Santa Barbara and the type appears to have been lost in the San Francisco fire. So we propose to designate a neoholotype which I fortunately found in my collection taken from the " Bath-House Beach" formation at Santa Barbara. It agrees very closely with the description. Barbarensis is found living off the southern California coast, very large ones being taken by Tremper off Newport. It extends down the Lower California coast as indicated by a large number of specimens dredged by the Crocker Expedition. These appear to be enough different to warrant a subspecific name. Localities for barbarensis include the following:
35 fms. off Newport (Tremper)
90 fms. off Avalon
85 fms. in the Santa Barbara Channel
250 fms. off Santa Cruz Island
40 fms. off Point Vicente
63-80 fms. , gravel, Monterey Bay; scarce.

F. kobelti (Dall),1877.

There is a problem here, The description calls for a whitish shell with brown lines, which seems to answer to the shells dredged off Catalina and, so far as we have been able to determine, nowhere else. I enclose a photo of a fine living specimen from the W. J. Raymond Collection. Dall also fig of a fine living specimen from the W.J. Raymond Collection. Dall also figured it (Proc. USNM 14:177, pl.6, fig.4, 1891). The brown lined shell is not found at Monterey, which leads us to suspect that Dall may have referred to more than one species in his description. If, on investigation, the type of kobelti in the U.S. National Museum, said by Oldroyd to come from Monterey, is actually the Monterey species and not what we have been calling monksae up to this time, then the Monterey species becomes kobelti, and the Catalina species is open for a new name, as it appears distinct. I know of no fossil kobelti like those from Catalina.

F. monksae Dall,1915.
New name for F. rugosus Trask, the type of which was also lost in the San Francisco fire. Named originally from a fossil. We propose to select a neoholotype from a fine lot collected by G. Willett from the Hilltop Quarry formation, where it appears to be common. As we understand it, monksae has a very heavy shell, with short spire and canal, and with a relatively rough sculpture following Trask's idea when he called this species rugosus. What we now call monksae is not at all like the Monterey species. Related species are your shells from off Redondo and kobelti from Catalina. It is found living as well as fossil and we now have on loan from George Willett three specimens he dredged in 30 fathoms off Catalina. I believe the Bormanns also have found dead shells on shore.

Fusinus (new species)
This is the Monterey species to which we have assigned a ms. name. It is the living representation of the fossil arnoldi. There is a southern race from San Pedro that appears to be rare in collections that we think may be enough different to warrant a subspecific name, and so we have tentatively assigned one. The animal is a brilliant red when alive, but it fades out in alcohol.

Fusinus (new species)
This is the species you dredge commonly off Redondo. It seems distinct enough from monksae (as we understand it), and from the Catalina kobelti to warrant a new species name, which we have assigned in our ms.

F. luteopictus Dall,1877
Subgenus Aptyxis. This is so well known that there is little further to add except that the northern limit so far seems to be Monterey.

F. harfordii (Stearns),1871.
The type is said to have come from " Big Spanish Flat". I don't know for sure where this is but I have assumed it to be at or near Little River, Mendocino Co. I would follow Dall in putting it in the subgenus Harfordia until better evidence is at hand that it belongs in one of the other groups. It is rare and pretty distinct as species of Fusinus go. We found 7 or 8 live ones after much diligent hunting during minus tides at Union Landing and at Albion. The animal is bright red and this is the thing to look for in trying to collect it. Once you know what you are looking for there is no possibility of confusing them with Searlesia dira , which has no shaggy periostracum and is found farther inshore.

F. diminutus Dall,1915.
According to Mackenzie Gordon, who examined the types of both species in the National Museum, this is Ocenebra lurida munda Dall. I think we can safely throw out diminutus.

F. taylorianus Reeve,1848.

Another species in the subgenus Aptyxis. It is much like luteopictus, but evidently distinct from it. Lots I have seen in the C.A.S. collection, sp. labelled, all come from the Gulf of California and I doubt its occurance in California. California records are, I suspect, misidentifications of luteopictus.

Metzgeria californica Dall,1903.

No comment except that it must be rare. We have one single shell from Monterey that seems enough different to name, so it is described and figured in our Monterey paper.

So much for comments on Fusinus, which, as I said should be considered as tentative and preliminary. I won't guarantee we won't change our minds later. It is quite possible we have gone too far in assigning new species and that it would be better to describe the new ones indicated above as subspecies under fossil species already named and from which the living species are derived. It will be of much interest to have the comments of Willett, Strong, Baily and others on this problem. I shall look forward to what they have to offer, in addition to your own and Tom's conclusions.

Editors Note- The above preview of the report to be made on the Monterey fauna is sincerely appreciated. For the past several years most of us have been disposed to simply label our specimens of Fusinus with question marks pening the completion of the study of Allyn and Mac Gordon. The conclusions reached sound as if we will have something to guide us in this group when this paper is published and we trust it will be soon.

This Fusinus matter is a good place to call attention to one of our problems. Different members of our club and correspondents no doubt have the same species classified under several entirely different species. The result is that when they write in their collecting records for these papers many of the conclusions are necessarily somewhat questionable. It seems to be a logical suggestion that students should have the free priviledge of questioning any of the records listed in these papers. As far as the editor is concerned he will be glad to submit any specimen listed for study and identification. Before we publish our final report it may be a good suggestion to have a committee appointed for the purpose of passing on specimens that have been the basis of questioned or surprising locality records. In this connection Mr. George Willett recently handed the editot a list of collecting records and data listed in our work on the pelecypods that he thinks should be definitely determined or rechecked. They follow.

Yoldia siliqua -- Cape Simpson, B.C. (Lowe)
Martesia intercalata -- Long Beach and San Pedro (Lowe)
Thyasira gouldii-- British Columbia
Psephidia ovalis -- Hawk Inlet, Alaska (Kate Stephens)
Modiolaria corrugate -- Unalaska (Eyerdam)
Thracia curta -- Prince William Sound
" beringi -- Unalaska and Atka Islands
Cardita alaskana -- Afognak I.
" paucicostata -- Atka I.
Thyasira gouldii-- Prince William Sound
Taras aleuticus -- " " "
Cardium californiense -- Alaska records
Psephidia ovalis -- Prince William Sound
Macoma middendorffii -- Atka I.
" inquinata arnheimi -- Akutan; Kodiak

Panomya ampla -- Puget Sound
" beringiana -- Unalaska

Mya truncata uddevallensis (I have specimens of probably what has been referred to this form, but consider them only individual variants of truncata.)

Also, I should like to see specimens of Transenella tantilla from from Alaska, and Glycymeris corteziana from Alaska and Puget Sound.

Alaska records for Lyonsia californica attributed to me, are incorrect. I did not collect that species in Alaska.

Allyn Smith is probably right in believing that Crenella divaricata does not come into our territory. Southern California shells are probably a small race of C. decussata.

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Mytilus edulis diegensis Coe,1945. Minutes #48 p 28

Dr. W.R. Coe has given us the following additional descriptive data on this new subspecies.

" Because of the great variability in the shape of the shell (see Minutes #41) due in part, at least, to environmental conditions, the most reliable criteria for distinguishing the species,subspecies and varieties of the Mytilus edulis group appear to be the characteristics of the lunule and the number and shape of the lunular ("hinge") teeth (See Lamy, Jour. Conch., 80,1936). In the subspecies diegensis which has become so abundant of latethe lunule is narrow and composed of usually 3 cornucopia-shaped ridges, with usually 2-4 teeth. The modal number is 3. In typical M. edulis of the Atlantic coast the lunule is broad, with usually 4-6 or more ridges and teeth. The modal number is 5. There is of course some overlapping; hence the shape of the shell must also be taken into consideration. Shell of typical M. edulis is commonly more nearly cylindrical and more often with ventral side incurved." Wesley R. Coe.

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Mr. C.L. Blakeslee, Mendon Center Road, Pittsford, N.Y. We have just received a fine long letter from our friend Blakeslee but before commenting upon that permit us to congratulate him on the excellent paper he has in the current Nautilus. It is the first article in the issue and is entitled " Snails from the Aboriginal Deposits of Frontenac Island, New York." Among other things Mr. Blakeslee in his letter says :

" I enjoy your papers and wonder how you get the time to devote to them. You deserve a lot of credit. And I think this present move is good sense.

I see Mrs. Hackney 's name mentioned. I did some trading with her during the winter which gave me, at least, a lot of pleasure not only in the exchanges but in the correspondence, though limited, that we had. Her letters reflect a fine personality.

What an excellent opportunity we conchologists have to make worth while contacts. And what priviledges those men of professional standing extend to us amateurs. From the beginning of my career as a collector I always have felt free (though sometimes ashamed to take their time) to write Dr. Pilsbry, William Clench, Henry van der Schalie, Mr. Goodrich and many others regarding my problems and not an inquiry but was given attention accompanied by a courteous reply. Frank C. Baker was another. And then in the exchanges I have a warm place in my heart for Walter J. Eyerdam, Chas. Nelson, Professor Louis Brand, Paul Reed and the Reverend Paul Ford. E.C. Doremus of New Jersey helped me build up a fine collection of shells from the South Pacific and he gave me very much more than I could send to him. There are a lot of others but one cannot name them all. I don't know where else one could find such warm cooperation. Of course, there may be an individual here or there that shrugs his shoulders at the rest of us but the rest go on and if he enjoys his isolated position, more power to him. And in that " warn place" I remember the fine brachiopods that you sent me. "

Minutes of the Conchological Club of Southern Calif.- July 1,1945
Called to order by the president Mr. George Willett.
Mrs. E.P. Chace appointed as Secretary Pro. Tem..
Mr. Burch reported that a large majority of those writing in had voted to continue meeting on Sunday afternoon until after the duration.
John Burch led the group in study and discussion of Nassaridae,Columbellidae, and some of the Muricidae.
Adjournment after the usual manner.

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In our work on the genus Pecten we discussed the species Pecten adscensionis Osbeck , and there was some speculation about the terrain of the island. There is quite an article about the island with pictures in color in the magazine Life for April 30,1945. Our final conclusion was that it is of no significance conchologically but the views of the island indicate a rocky cliff like ocean frontage.

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Mrs. Harrison Smith, 803 Weightman Bldg., 1524 Chestnut St., Philadelphia 2, We wish to thank Mrs. Smith for her check and her bouquet " Thank you ever so much for sending these minutes to me for I enjoy them greatly".

Mr. Wm. H. Weeks, 508 Willoughby Ave., Brooklyn 6, N.Y. We were glad to hear from Mr. Weeks and to learn that he is still actively at this time exchanging and working on his collection. Mr. Weeks has some beautiful material for exchange. Some of his duplicates come from the tropical Pacific and other far away localities.

#50 Back Page July,1945

J.M. Dowdle, S 1c, New Guinea, 8 June 1945, P.A.D. #3, F.P.O., San Francisco, Calif. We were very glad to have a nice long letter from Jack and some excerpts from it follow. " I am still in P.A.D. 3 but I am working for the 25th Special Battalion. They publish the base newspaper and I work on it..... I have collected nothing except some Littorina and Pythia which fortunately, I was able to take alive. The other things that I have taken recently are very much the same things that I sent you. .... The base commander has been good enough to assist me in procuring a boat that I can rig for work. I plan to build a dredge and work from about ten fathoms to the surface. That takes in a lot of territory that way and I can only hope to be able to get the material to someone like yourself to do the research. I have had a lot of correspondence with Myra Keen and she has been very nice about everything and has offered to do much of the work. It was unfortunate that I was unable to contact Lt. Col. Schenck. .... If I am lucky enough to collect live Conus , especially Conus textile I am going to do some work on the spot. The Malaria Control Officer has been good enough to let me use his lab (there is a fine bifocal disecting microscope, among other things) for some special work. I have my old 4 x 5 Century that I have converted for photo-micography and it works fine. I was able to get some good pictures of Plasmodia (Malaria parasites) and a Filiarial sheath, Wacheria bancroftii etc. I will attempt to stain and photograph the poisonous and associated parts. Can you give me any information along that line ? "

Henry A. Rothamel, 3903 Sinclair Lane, Baltimore 13, Maryland. " I have written before that an accident injuring my eye nerves caused me to lay aside this lobby temporarily. Now they are again in condition, where I want to get back to building up my collection. If there are members of the club who have surplus shells I am interested in purchasing the same. Enclosed find $3.00 for Minutes. Thanks."

Ralph W. Jackson, Route No.1, Cambridge, Maryland. " Enclosed find check for $2.50 for a year of the Minutes of the Conchological Club of Southern Calif. Do you have any copies of these minutes prior to the November 1942 issue ? This was the first issue that came to my notice and I would be glad to complete my file if that is possible or as near thereto as is permissible. A note in the next or some future issue as to when the publication started would be a matter of record and a source of information to the late comers."

In answer to Mr. Jackson's inquiry the present editor is compelled to admit that he does not know the exact date of the first publications of this club. The Conchological Club of Southern California has been in continuous existence for over fifty years and during that period has had numerous papers printed under different editors. The immediate predecessor of the present editor printed his papers under the title of " Notes" of the Conch. Club etc. This present series began with the July,1941 minutes and the first few issues were little more than just the minutes and announcements of the next meeting etc. The mimeographed papers grew gradually until we are now running off a number of pages as you know.

W.P. Cook, 2966 Union Ave., San Diego 1, Calif. We regret to announce that our good friend Cook is in the hospital and are concerned for him and hope that it will not be long before he can again resume his pursuit of (his recent special interest was Argonauta of which he has several fine sets).

P.A. Rickles, 7 Jefferson Blvd.,Annandale,Staten Island, N.Y. " I am a new shell bug since my return from the Pacific with a collection of shells."

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